# THE JOURNAL OF GAS LIGHTING
## WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LIII. No. 1341.] LONDON, JANUARY 22, 1889. [41ST YEAR. Price 6d.



**WOLSTON'S** Paste and Ready Mixed for Use.

Warranted Free from Adulteration. **TORBAY PAINTS.**

FOR GASHOLDERS, &c., &c.

The Original "Torbay Paints"

As supplied during many years to the LONDON GASLIGHT & COKE COMPANY.

TORBAY & DART PAINT Co., Ld.,

23, Gt. George St., Westminster, S.W.

DARTMOUTH, & BRIXHAM (TORBAY).

— ESTABLISHED 1830. —

**PARKER & LESTER,**

Manufacturers & Contractors.

THE ONLY MAKERS OF

PATENT ANTIMONY PAINT,

Parker's Imperial Black Varnish,

*Oxide Paints, Oils, and General Stores for Gas and Water Works.*

WORKS:

ORMSIDE STREET, OLD KENT ROAD, LONDON.

Ashmore, Benson, Pease, & Co., Ld.,

STOCKTON-ON-TEES,

Manufacturing Gas Engineers.

*See Advertisement, p. 87.*

CUTLER'S PATENT WATER VALVES FOR PURIFIERS SUITABLE FOR ALL CHANGES.

LEAKAGE IMPOSSIBLE.

TESTIMONIALS on APPLICATION.

S. CUTLER & SONS,

CONTRACTORS FOR GAS-WORKS

MILLWALL, LONDON, E.

# SIMON'S
# AMMONIA PLANT FOR GAS-WORKS.

Improved Continuous Distillation. Extracts all Ammonia.

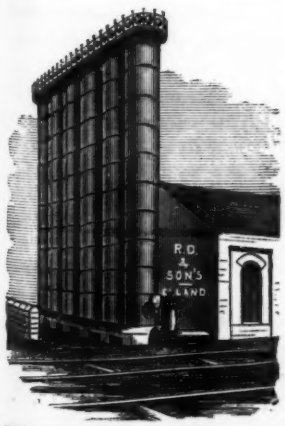
Produces either Sulphate or Liquor Ammoniæ. No Clogging with Lime.

This Apparatus has been successfully at work for years in over 100 Establishments in England, Germany, France, and America.

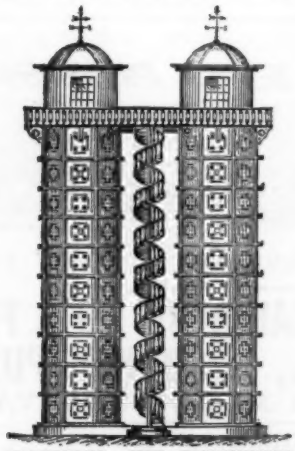
HENRY SIMON, 20, MOUNT STREET, MANCHESTER.

# R. DEMPSTER & SONS, LTD.,
## ELLAND, YORKS.,

MANUFACTURERS and CONTRACTORS for EVERY DESCRIPTION of GAS and CHEMICAL PLANT.

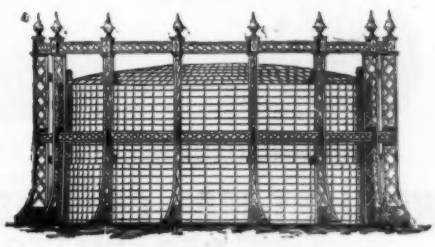



WROUGHT-IRON ANNULAR AND HORIZONTAL CONDENSERS.
Thoroughly effective.
Improved Construction.



SCRUBBERS ANY DIMENSIONS.
OURS continue to give the BEST RESULTS.

ESTIMATES, SPECIFICATIONS, & ILLUSTRATIONS ON APPLICATION.



GASHOLDERS
OF EVERY DESCRIPTION AND SIZE.

Makers of Livesey's Patent Washers for the Colonies and Abroad.

# DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

## GASHOLDER AND BOILER WORKS,

**WEST BROMWICH, NEAR BIRMINGHAM (Established 1765),**

MANUFACTURER OF

## TELESCOPIC AND SINGLE GASHOLDERS,

**WROUGHT AND CAST IRON TANKS FOR DITTO,**

**PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, AND ALL KINDS OF GAS APPARATUS,**

**WROUGHT-IRON ROOFS, BRIDGES, GIRDERS, ETC.,**

**STEAM, HOT WATER, AND RANGE BOILERS, TANKS, CISTERNS, BOATS,**

AND ALL KINDS OF WROUGHT-IRON WORK.

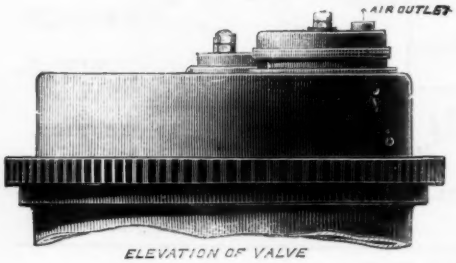
**Drawings, Specifications, and Estimates supplied on application.**

---

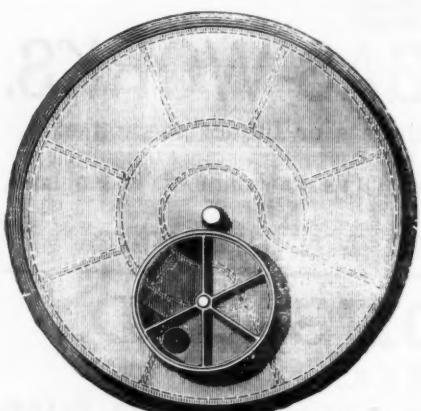
# EDWARD COCKEY & SONS, LTD.,

## GAS ENGINEERS, IRONFOUNDERS, & CONTRACTORS,

MAKERS OF GASHOLDERS, TANKS, & GAS APPARATUS OF EVERY DESCRIPTION,
SULPHATE & LIQUID AMMONIA PLANTS.



ELEVATION OF VALVE


PLAN OF TOP OF CENTRE VALVE FOR FOUR PURIFIERS

Wood Grates for Purifiers. / Wood Boards for Scrubbers. / Cast-Iron Main Pipes and Connections. / Station Meters. / Governors. / Valves of every description. / Brass Fittings. / Lamp Columns. / Boilers. / Weighbridges. / Coke Breakers. / &c., &c.

Patent Washers with improved Overflow Arrangements, requiring no Motive Power, and giving unexcelled results.

**PATENT SELF-ACTING BYE-PASS VALVES FOR EXHAUSTING APPARATUS.**

*Patent Centre-Valves, working all Four Purifiers in a Set, or Three, Two, or One, in Rotation.*

**PATENT FOUR-WAY BYE-PASS VALVES.**

PATENT AIR-CLEARING VALVES FOR WORKING IN CONNECTION WITH CENTRE-VALVES.

The illustration shows one of our new Patent Air-Clearing Valves as fixed on the Cover of a Centre-Valve. When in action, the clean gas from the Outlet Chamber of the Valve is passed down the Outlet-Box of the Purifier last changed, and forced through the Inlet into the Air-Clearing Valve, from which a proper outlet is provided on the top, leaving the Purifier ready charged with clean gas in place of air, as is usual; thus preventing the spoiling or wasting of a large quantity of gas.

Many of these Valves have been fixed, and are giving every satisfaction.

TESTIMONIALS ON APPLICATION.

Drawings, Specifications, and Estimates for Apparatus (and the necessary Buildings and Tanks if desired) furnished on application.

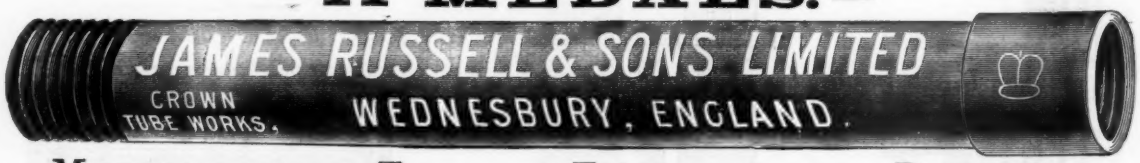
THE IRON-WORKS, FROME SELWOOD, SOMERSET.

Telegraphic Address: "COCKEYS, FROME." INQUIRIES INVITED.

---

*HIGHEST AWARDS—LONDON, PARIS, COLOGNE, VIENNA, MELBOURNE, AND OTHERS.*

## —11 MEDALS.—




MANUFACTURERS OF TUBES AND FITTINGS OF EVERY DESCRIPTION.

## WROUGHT-IRON OR STEEL MAINS UP TO 6 FEET DIAMETER, FOR GAS, WATER, OIL, OR OTHER PURPOSES.

SCREWING TACKLE, BOILER MOUNTINGS, VALVES, COCKS, ETC.

LONDON: 108, Southwark Street. BIRMINGHAM: 114, Colmore Row. LEEDS: 6, Mark Lane, New Briggate.

# THOMAS PIGGOTT & CO.,

(ESTABLISHED 1822)

SPRING HILL, BIRMINGHAM,

MANUFACTURERS OF

GAS APPARATUS

OF EVERY DESCRIPTION

INCLUDING

GASHOLDERS

and Tanks,

Retorts, Purifiers,

Valves, Scrubbers,

Condensers,

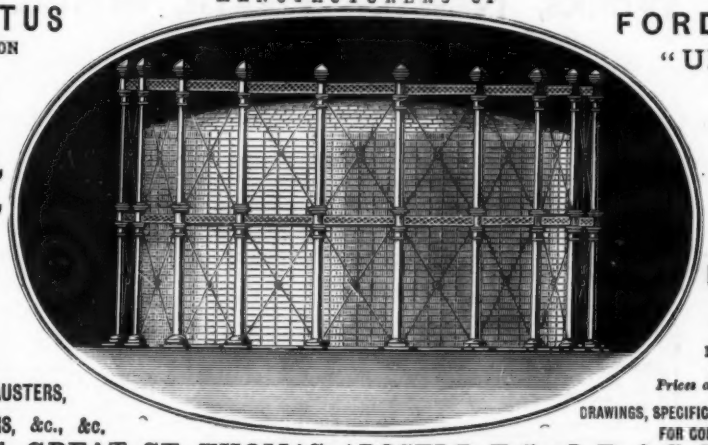
ETC., ETC.

*All of the most approved Designs.*

BOILERS, ENGINES, PUMPS,

BEALE'S and other EXHAUSTERS,

METERS, GAUGES, GOVERNORS, &c., &c.



FORD'S PATENT

"UNIVERSAL"

SCRUBBER-

WASHER.

*Numbers at work, giving excellent results.*

No Motive Power Required.

ALSO OF

SOMERVILLE'S PATENT

RETORT MOUTHPIECES

AND

SELF-SEALING LIDS.

NO LUTING REQUIRED.

*Prices and Particulars on application.*

DRAWINGS, SPECIFICATIONS, AND ESTIMATES PREPARED FOR COMPLETE GAS PLANT.

London Offices: 14, GREAT ST. THOMAS APOSTLE, E.C.—J. E. & S. SPENCER, Agents.

ESTABLISHED 1825.

# GAS TUBES

MANUFACTURERS OF EVERY DESCRIPTION OF

## IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

# NEWTON, CHAMBERS, & CO., LIMITED,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

SLIDE VALVES,

WITH RACK & PINION,

OR

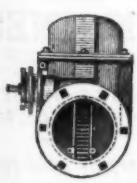
Internal or External

SCREWS, of all Sizes.

GASHOLDERS,

AND

Gasholder Tanks.



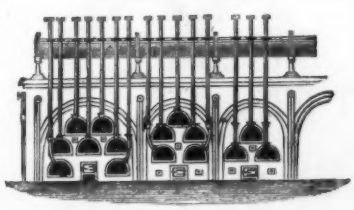
CAST-IRON RETORTS,

RETORT-BED FITTINGS,

AND RETORT-HOUSE APPLIANCES

of every description.

Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

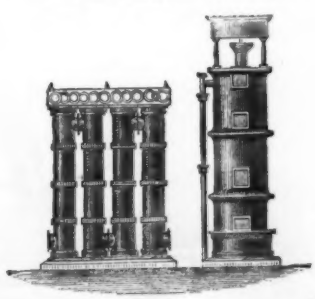


WROUGHT AND CAST IRON

CONDENSERS,

SCRUBBERS, & WASHERS

TAR AND LIQUOR PUMPS, &c.



PATENT

CENTRE VALVES

for working Purifiers.

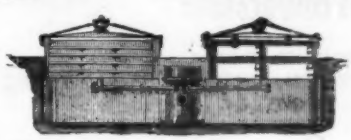
Also Bye-Pass & Stop Valves.

PURIFIERS with Planed Joints.

HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS.

WOOD GRIDS.

CAST AND WROUGHT IRON TANKS AND CISTERNS.



*DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.*

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

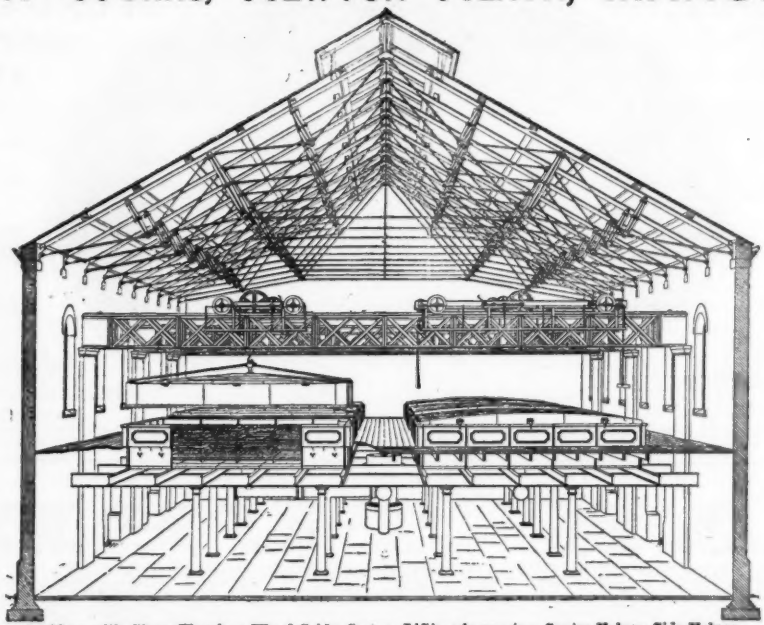
# R. & J. DEMPSTER,

## Engineers, Ironfounders, & Contractors,

## GAS PLANT WORKS, NEWTON HEATH, MANCHESTER.

*WROUGHT-IRON*
Roofs,
Girders,
Bridges,
Retort-Lids,
Ascensions,
Hydraulics,
Foul Mains,
Condensers,
Boilers,
Gasholders,
Tanks,
Stills,
Services.

CHEMICAL PLANT.



*CAST-IRON*
Columns,
Beams,
Floor Plates,
Retorts,
Fittings,
Brackets,
Washers,
Scrubbers,
Purifiers,
Valves,
Tanks,
Mains,
Lamp-posts.

STRUCTURAL IRONWORK.

Purifiers with Stage Flooring, Wood Grids, Covers, Lifting Apparatus, Centre-Valves, Side-Valves, Connections, and Roofs of every variety and for any size of Gas-Works.

Sole Makers of Livesey's Patent Washer north of Birmingham.

*ESTIMATES, WITH SPECIFICATIONS AND ILLUSTRATIONS, FURNISHED UPON APPLICATION.*

**LONDON OFFICES: 181 and 182, GRESHAM HOUSE, OLD BROAD STREET, E.C.**

Telegraphic Addresses: "SCRUBBER MANCHESTER" and "SCRUBBER LONDON."

## HARRIS & PEARSON,

**STOURBRIDGE, ENGLAND.**

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.

GLAZED BRICKS AND PORCELAIN BATHS.

# CROSSLEY'S "OTTO" GAS-ENGINE.

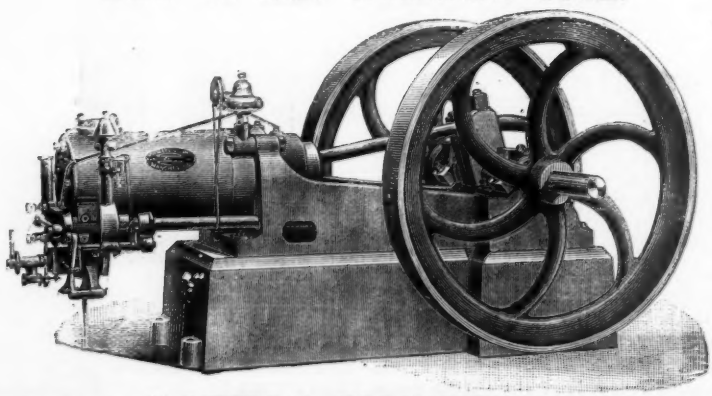
## 70 Prize Medals.

NEW 14 H.P. NOMINAL SIZE.

MADE in SIZES
*2 Man to 100 HP.*

GAS-ENGINES
COMBINED
WITH
PUMPS
FOR
TOWNS SUPPLY,
SEWAGE, &c., &c.

GAS-ENGINES
COMBINED
WITH
AIR COMPRESSORS
FOR THE
SCHONE SEWAGE
SYSTEM, LUCIGEN
LIGHT, &c.



MADE in SIZES
*2 Man to 100 HP.*

VERTICAL
AND
HORIZONTAL
TYPES.

ENGINES
*COMBINED*
WITH
HOISTS, PUMPS,
DYNAMOS, &c., &c.

*Largely used for*
*EXHAUSTING,*
*PUMPING,*
*COKE CRUSHING,*
*ELECTRIC LIGHTING,*
&c., &c.

**Over 27,000 "OTTO" ENGINES have now been made.**

# CROSSLEY BROS., LTD., OPENSHAW, MANCHESTER,

LONDON,
LIVERPOOL,
GLASGOW,
NEWCASTLE.

# KIRKHAM, HULETT, & CHANDLER, LIMITED.

(Mr. SIDNEY HERSEY, Managing Director.—Address at foot.)

## 351 Patent "Standard" Washer-Scrubbers,

**Equal to a Daily Capacity of 306,600,000 Cubic Feet of Gas,**

*Erected and in course of construction at present date, amongst them being the following, viz.:—*

| | Capacity. Cubic feet per day. |
|---|---|
| Altrincham | 600,000 |
| Adelaide | 600,000 |
| Aldershot | 200,000 |
| Allegheny, U.S.A. | 1,000,000 |
| Ashton-under-Lyne | 1,250,000 |
| Amsterdam | 1,500,000 |
| ,, | 1,500,000 |
| Annaberg | 200,000 |
| Arcachon | 100,000 |
| Animal Charcoal Co.. | 200,000 |
| Altoona, U S.A. | 350,000 |
| Buxton | 250,000 |
| Bradford | 1,000,000 |
| ,, | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 1,000,000 |
| ,, | 1,000,000 |
| ,, | 3,000,000 |
| Bremen | 150,000 |
| Baltimore, U.S.A. | 1,000,000 |
| ,, | 1,000,000 |
| ,, | 1,000,000 |
| Balmain, N.S.W. | 125,000 |
| Bishops Stortford | 150,000 |
| Blackpool | 400,000 |
| Brussels | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 750,000 |
| ,, | 1,250,000 |
| Banbury | 250,000 |
| Birmingham | 5,000,000 |
| Birkenhead | 2,500,000 |
| Blackburn | 1,500,000 |
| Bochum | 600,000 |
| Burntisland | 250,000 |
| Boston, U.S.A. | 2,000 000 |
| Brisbane | 1,500,000 |
| ,, | 300,000 |
| Burton-on-Trent | 1,500,000 |
| Barcelona | 350,000 |
| Barking | 100,000 |
| Baerlien & Co. | 20,000 |
| ,, | 420,000 |
| Bombay | 700,000 |
| Buffalo, U.S.A. | 550,000 |
| ,, | 500,000 |
| Brooklim, U.S.A. | 300,000 |
| Bergen | 250,000 |
| Berlin | 150,000 |
| Bournemouth | 1,000,000 |
| Bridgeport, U.S.A. | 500,000 |
| Brunswick | 300,000 |
| Beck & Co., St. Louis | 100,000 |
| Barmen Rittershausen | 600,000 |
| Bexhill | 125,000 |
| Brooklyn, U.S.A. | 1,000,000 |
| ,, | 1,000,000 |
| Brunner, Mond, & Co. | 400,000 |
| Cheltenham | 2,000,000 |
| Cannes | 200,000 |
| Croydon | 1,500,000 |
| Copenhagen | 200,000 |
| Clevedon | 200,000 |
| Columbus, U.S.A. | 500,000 |
| Cincinnati, U.S.A. | 1,500,000 |
| ,, | 1,500,000 |
| Chicago, U.S.A. | 3,000,000 |
| ,, | 1,000,000 |
| ,, | 1,000,000 |
| Chemnitz | 1,000,000 |
| Crewe | 1,250,000 |
| Colonial Gas-Works Co. | 100,000 |
| Cadiz | 300,000 |
| Charottenberg | 600,000 |
| Dudley | 750,000 |
| Driffield | 100,000 |
| Dukinfield | 500,000 |
| Dover | 750,000 |
| ,, | 1,000,000 |
| Deal | 200,000 |
| Derby | 1,500,000 |

| | Capacity. Cubic feet per day. |
|---|---|
| Dublin | 3,000,000 |
| Dowlais | 100,000 |
| Douai | 500,000 |
| Denton | 500,000 |
| Derby, U.S.A. | 350,000 |
| Denver, ,, | 500,000 |
| ,, ,, | 1,000,000 |
| Düsselldorf | 750,000 |
| ,, | 500,000 |
| Dumfries | 250,000 |
| Dunedin, N.Z. | 400,000 |
| Darlington | 1,250,000 |
| Detroit, U.S.A. | 750,000 |
| Edinburgh | 1,500,000 |
| ,, | 2,000,000 |
| Enfield | 300,000 |
| Essen | 300,000 |
| Elbing | 150,000 |
| Falmouth | 150,000 |
| Frankfort | 300,000 |
| Farnworth | 400,000 |
| Fenton | 400,000 |
| Friedenshütte | 500,000 |
| Fürth | 400,000 |
| Freiburg | 200,000 |
| Goole | 250,000 |
| Glossop | 300,000 |
| Guildford | 300,000 |
| Gloucester | 1,250,000 |
| Gera | 300,000 |
| Grafton, N.S.W. | 100,000 |
| Grieg | 300,000 |
| Georgetown, U.S.A. | 250,000 |
| Gluckauf | 200,000 |
| Heywood | 600,000 |
| Holywood | 125,000 |
| Huy | 70,000 |
| Harrow | 250,000 |
| Harrogate | 250,000 |
| Halstead | 150,000 |
| Heilbronn | 200,000 |
| Havanna, Cuba | 750.000 |
| Hastings | 1,500,000 |
| Huddersfield | 300,000 |
| ,, | 750,000 |
| ,, | 1,500,000 |
| Hof | 200,000 |
| Hampton Wick | 500,000 |
| Heckmondwike | 500,000 |
| Haverfordwest | 100,000 |
| Halifax, N.S. | 350,000 |
| Hamm | 200,000 |
| Halle | 400.000 |
| Heidelberg | 300,000 |
| Hartford, U.S.A. | 1,000,000 |
| Ilkeston | 300,000 |
| Inverness | 250,000 |
| Ilkley | 200,000 |
| Ilford | 100.000 |
| Kingston-on-Hull | 400,000 |
| Kidderminster | 750,000 |
| Kidsgrove | 100,000 |
| Königsberg | 1,000,000 |
| King's Lynn | 300,000 |

**LONDON:—**

| | |
|---|---|
| The Gaslight and Coke Co. :— | |
| Beckton | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 1,250,000 |
| ,, | 2,500,000 |
| ,, | 2,500,000 |
| Silvertown | 1,000,000 |
| Bromley | 2,000,000 |
| ,, | 1,500,000 |
| ,, | 1,500,000 |
| ,, | 1,500,000 |
| ,, | 2,000,000 |
| ,, | 1,500,000 |

| LONDON—*Continued.* | Capacity. Cubic feet per day. |
|---|---|
| Shoreditch | 2,500,000 |
| Pancras | 1,500,000 |
| ,, | 1,500,000 |
| Pimlico | 2,000,000 |
| Nine Elms | 3,000,000 |
| ,, | 3,000,000 |
| South Metropolitan Co. :— | |
| Greenwich | 3,000,000 |
| Woolwich | 400,000 |
| Vauxhall | 3,000,000 |
| ,, | 3,000,000 |
| Lea Bridge | 300,000 |
| West Ham | 1,500,000 |
| Leeds | 2,000,000 |
| ,, | 3,000,000 |
| ,, | 3,000,000 |
| ,, | 3,000,000 |
| ,, | 3,000,000 |
| ,, | 2,000,000 |
| Leominster | 150,000 |
| Leiden | 560,000 |
| ,, | 600,000 |
| Liverpool | 2,000,000 |
| ,, | 2,000,000 |
| ,, | 2,000,000 |
| ,, | 2,000,000 |
| ,, | 2,000,000 |
| ,, | 3,000,000 |
| Lincoln | 1,000,000 |
| ,, | 600,000 |
| Lowell, U.S.A. | 1,000,000 |
| Laclede, ,, | 1,000,000 |
| Louisville ,, | 1,500,000 |
| Long Eaton | 500,000 |
| Lille | 900,000 |
| ,, | 450,000 |
| ,, | 750,000 |
| ,, | 250,000 |
| ,, | 250,000 |
| Luckenwalde | 330,000 |
| Liegwitz | 300,000 |
| Lincoln, U.S.A. | 250,000 |
| Lawrence ,, | 500,000 |
| Lynn ,, | 300,000 |
| Lyons | 1,500,000 |
| Maidstone | 1,000,000 |
| Marseilles | 1,500,000 |
| ,, | 1,500,000 |
| Mons | 500,000 |
| Malines | 250,000 |
| Melbourne | 1,500,000 |
| ,, | 1,500,000 |
| ,, | 1,500,000 |
| ,, | 1,500,000 |
| ,, | 1,500,000 |
| Manchester | 2,500,000 |
| Middleton | 400,000 |
| Manley, N.S.W. | 100,000 |
| Minneapolis, U.S.A. | 750,000 |
| Magdeburg | 300,000 |
| Memphis, U.S.A. | 750,000 |
| Nottingham | 1,250,000 |
| ,, | 2,500,000 |
| ,, | 2,500,000 |
| ,, | 2,000,000 |
| ,, | 1,500,000 |
| ,, | 2,000,000 |
| Newport, U.S.A. | 430,000 |
| Newmarket | 150,000 |
| Newark, U.S.A. | 680,000 |
| Northfleet | 200,000 |
| New York, U.S.A. | 2,000,000 |
| Nice | 600,000 |
| Newcastle, N.S.W. | 200,000 |
| Numea, ,, | 100,000 |
| Namur | 250,000 |
| Newark | 350,000 |
| Nassau, U.S.A. | 1,000,000 |
| Oldbury | 500,000 |
| Otley | 200,000 |
| Oswestry | 250,000 |

| | Capacity. Cubic feet per day. |
|---|---|
| Ober Schlesian | 1,500,000 |
| Otto & Co.'s Coke Works | 1,500,000 |
| Plymouth | 2,000,000 |
| Parramatta, N.S.W. | 100,000 |
| Prescot | 150,000 |
| Providence. U.S.A. | 750,000 |
| ,, | 750,000 |
| Plauen | 300,000 |
| ,, | 300,000 |
| Portsmouth | 2,500,000 |
| ,, | 2,500,000 |
| Pittsburgh, U.S.A. | 1,500,000 |
| Portland ,, | 560,000 |
| Pawtucket ,, | 500,000 |
| Quebec | 250,000 |
| Radcliffe | 750.000 |
| Rouen | 250,000 |
| Ramsgate | 1,000,000 |
| Reigate | 200,000 |
| Richmond, U.S.A. | 250,000 |
| Roxbury, ,, | 500,000 |
| Runcorn Soap Co. | 20,000 |
| Rockhampton, N.S.W. | 125,000 |
| Richmond | 1,500,000 |
| Reading | 2,000,000 |
| Reichenbach | 200,000 |
| Salford | 1,750,000 |
| ,, | 1,750,000 |
| ,, | 1,750,000 |
| Smethwick | 750,000 |
| Sydney, N.S.W | 1,000,000 |
| ,, | 1,000,000 |
| ,, | 2,500,000 |
| ,, | 50,000 |
| ,, | 50,000 |
| Sunderland | 1,500,000 |
| St. Joseph's, U.S.A. | 250,000 |
| Spa | 100,000 |
| Sevenoaks | 300,000 |
| St. Petersburg | 2,000,000 |
| ,, | 1,500,000 |
| St. Louis, U.S.A. | 2,000,000 |
| ,, | 2,000,000 |
| ,, | 1,000,000 |
| Silesian Coal Co. | 600,000 |
| San Francisco, U.S.A. | 2,000,000 |
| ,, | 2,000,000 |
| Sheepbridge Coal Co. | 40,000 |
| Stettin | 200,000 |
| Singapore | 300,000 |
| Sutton | 500,000 |
| Tonbridge | 150,000 |
| Tipton | 400,000 |
| Tottenham | 1,000,000 |
| Toledo, U.S.A. | 750,000 |
| Toronto | 1,000,000 |
| Uxbridge | 300,000 |
| Valparaiso | 500,000 |
| West Bromwich | 1,000,000 |
| Willenhall | 250,000 |
| Weston-super-Mare | 500,000 |
| Waltham | 150,000 |
| Wormwood Scrubbs | 300,000 |
| Williamsburg, U.S.A. | 600,000 |
| ,, | 600,000 |
| Wellington | 150,000 |
| Warwick | 300,000 |
| Wheeling, U.S.A. | 500,000 |
| Walker | 300,000 |
| Westgate | 100,000 |
| Wilmington, U.S.A. | 500,000 |
| Windsor, N.S.W. | 100,000 |
| Wolverton | 100,000 |
| Wellington, N.Z. | 250,000 |
| Whitchurch | 175,000 |
| Washington, U.S.A. | 2,000,000 |
| Wallasey | 750,000 |
| Weimar | 150,000 |
| Wurzen | 200,000 |
| Worcester, U.S.A. | 750,000 |
| Yeadon | 500,000 |
| Yeovil | 250,000 |

*Address: 59 & 60, Palace Chambers, Bridge St., Westminster, London, S.W.*

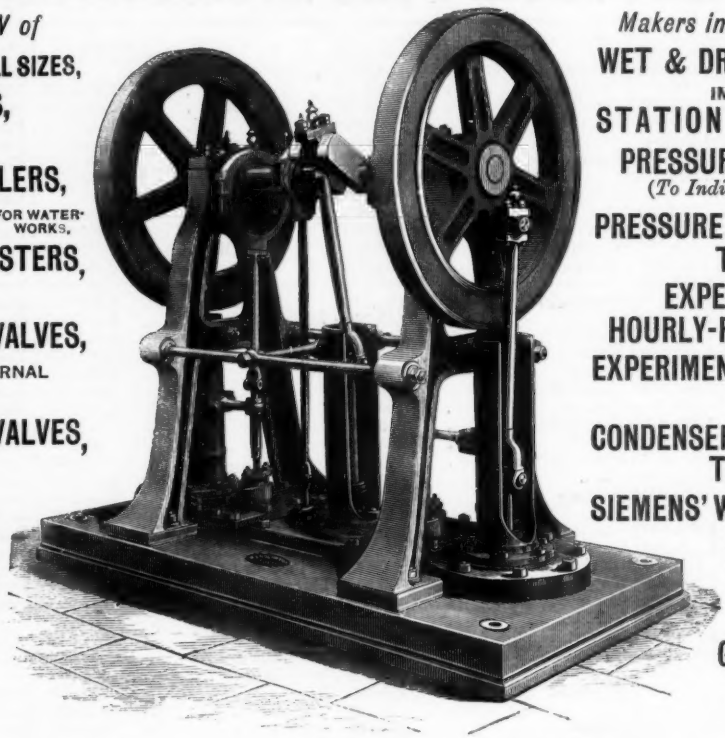
# R. LAIDLAW & SON,

## GAS AND WATER ENGINEERS.

Manufacturers of **GAS APPARATUS** of every Description.

*Makers in GLASGOW of*

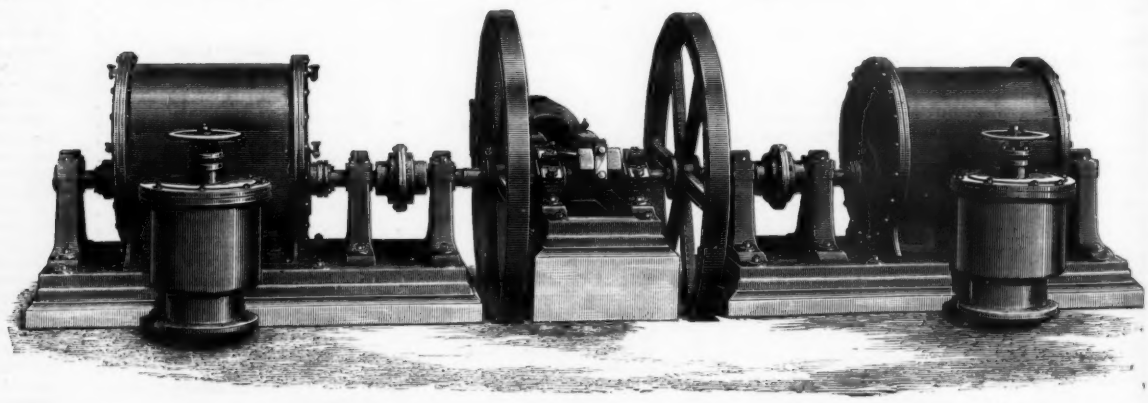
CAST-IRON PIPES, ALL SIZES,
LAMP PILLARS,
STEAM-ENGINES AND BOILERS,
PUMPING ENGINES FOR WATER-WORKS,
BEALE'S GAS EXHAUSTERS,
DOUBLE-FACED SLUICE VALVES,
INTERNAL AND EXTERNAL RACK OR SCREW SLIDE VALVES,
CAST-IRON COLUMNS,
BEAMS, GIRDERS, AND WATER-TANKS,
WROUGHT-IRON TUBES, FITTINGS, &c.



*Makers in EDINBURGH of*

WET & DRY GAS-METERS,
IMPROVED STATION GOVERNORS,
PRESSURE REGISTERS (*To Indicate New Time*),
PRESSURE GAUGES,
TEST HOLDERS,
EXPERIMENTAL HOURLY-RATE METERS,
EXPERIMENTAL TEST METERS,
CONDENSER THERMOMETERS,
SIEMENS' WATER-METERS,
STREET LANTERNS,
*And all Kinds of* GAS APPARATUS AND FITTINGS, &c.

PUMPING GAS EXHAUSTER AND ENGINE COMBINED. All Sizes.



BEALE'S GAS EXHAUSTERS AND ENGINE COMBINED. All Sizes.

*Prices, with full Particulars, will be given on application.*

**Two Gold Medals, One Silver Medal, One Bronze Medal, and Two Honourable Mentions,**
INTERNATIONAL EXHIBITION, EDINBURGH, 1886.

ALLIANCE FOUNDRY, **GLASGOW.** | SIMON SQUARE WORKS, **EDINBURGH.** | 6, LITTLE BUSH LANE, **LONDON, E.C.**

# TANGYES LIMITED,

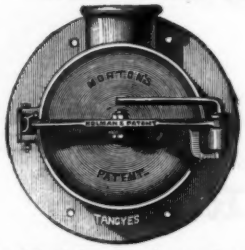
CORNWALL WORKS, BIRMINGHAM.

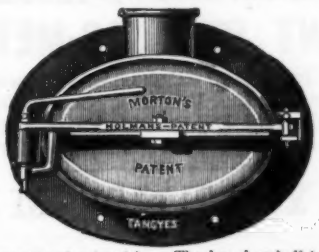
DEPÔTS AT

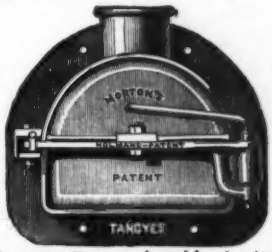
LONDON . . . . . 35, QUEEN VICTORIA ST., E.C.
NEWCASTLE-ON-TYNE . . . ST. NICHOLAS BUILDINGS
MANCHESTER . . . . . DEANSGATE
GLASGOW . . . . . ARGYLE STREET

Sole Makers of **MORTON'S** Patent Self-Sealing **RETORT-LIDS,**

With Anti-Friction CATCHES, and Self-Sustaining CROSS-BARS.




*Price of Mouthpieces depends on number required, which please state when inquiring. The sizes given in list we have patterns for; new patterns are charged for at cost price.*

These Patent Retort Lids and Fastenings are in extensive use in most of the Gas-Works in Great Britain, America, and on the Continent, and have almost entirely displaced the older method of sealing by a luting of lime or other material. The Lids are made in three forms, D, oval, and round (as shown above), in each of which we have a very extensive variety of patterns, from which Gas Engineers contemplating the adoption of these lids are recommended to make their selection, in order to avoid cost of pattern making, delays, &c., &c.

**Mouthpieces with Circular Lids for Oval Retorts.**

| Pattern No. | Diam. Mouth. | Internal Dimensions of Retort. | Length of Mouthpiece. | PRICE, Lid and Fittings without Mouthpiece. |
|---|---|---|---|---|
| 13658 | 14 ins. | 14 × 12 ins. | 15 ins. | £0 19 0 |
| 4356 | 14 „ | 18½ „ 12 „ | 12½ „ | 0 19 0 |
| 6851 | 15 „ | 16 „ 14 „ | 13 „ | 1 0 0 |
| 3629 | 15 „ | 18½ „ 13½ „ | 14 „ | 1 0 0 |
| 3580 | 15 „ | 21 „ 15 „ | 15 „ | 1 0 0 |
| 6264 | 16 „ | 18½ „ 15½ „ | 15½ „ | 1 1 0 |
| 5210 | 16 „ | 20 „ 14 „ | 15 „ | 1 1 0 |
| 6263 | 16 „ | 24 „ 16 „ | 13½ „ | 1 1 0 |
| 5370 | 17 „ | 20 „ 14 „ | 14 „ | 1 3 0 |
| 6832 | 17 „ | 20 „ 14 „ | 17 „ | 1 3 0 |
| 6183 | 17 „ | 20 „ 15 „ | 15 „ | 1 3 0 |
| 4289 | 17 „ | 21 „ 15 „ | 14 „ | 1 3 0 |
| 5270 | 17 „ | 22 „ 14 „ | 14 „ | 1 3 0 |
| 3631 | 18 „ | 18 „ 14 „ | 20 „ | 1 5 0 |
| 3681 | 18 „ | 21 „ 14 „ | 13½ or 15 „ | 1 5 0 |
| 3554 | 18 „ | 21 „ 15 „ | 14½ „ | 1 5 0 |
| 7957 | 18 „ | 22 „ 16 „ | 14 „ | 1 5 0 |
| 8048* | 19 „ | 25½ „ 15 „ | 18 „ | 1 8 6 |

**Mouthpieces with Oval Lids for Oval Retorts.**

| Pattern No. | Dimensions of Mouth. | Internal Dimensions of Retort. | Length of Mouthpiece. | PRICE, Lid and Fittings without Mouthpiece. |
|---|---|---|---|---|
| 9800 | 18 × 14⅞ ins. | 18 × 14⅞ ins. | 15 ins. | £1 5 0 |
| 9205 | 20 „ 12 „ | 24 „ 14 „ | 10½ „ | 1 10 0 |
| 10000 | 20½ „ 14½ „ | 20½ „ 14½ „ | 15 „ | 1 10 0 |
| 9680 | 21 „ 15 „ | 21 „ 15 „ | 15 „ | 1 12 0 |
| 10056 | 21 „ 14½ „ | 21 „ 14½ „ | 15½ „ | 1 12 0 |
| 13218 | 21 „ 15 „ | 21 „ 15 „ | 17 „ | 1 12 0 |
| 10514 | 22½ „ 19⅜ „ | 22½ „ 19⅜ „ | 15½ „ | 1 13 0 |
| 13766 | 20 „ 17 „ | 20 „ 17 „ | 15⅞ „ | 1 15 0 |
| 13269 | 24 „ 15 „ | 24 „ 15 „ | 16 „ | 1 18 0 |

190

**Mouthpieces for Round Retorts.**

| Diam. .. .. .. .. ins. | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|
| Price, Lid and Fittings without Mouthpiece £ | 0 19 0 | 1 0 | 1 1 0 | 1 3 0 | 1 5 0 |

**Mouthpieces with Circular Lids for D Retorts.**

| Pattern No. | Diam. Mouth. | Internal Dimensions of Retort. | Length of Mouthpiece. | PRICE, Lid and Fittings without Mouthpiece. |
|---|---|---|---|---|
| 5348 | 14 ins. | 14 × 18 ins. | 7 ins. | £0 19 0 |
| 3463 | 15 „ | 15 „ 18 „ | 14 „ | 1 0 0 |
| 6678 | 15 „ | 15 „ 14 „ | 13 „ | 1 0 0 |
| 3661 | 15½ „ | 15½ „ 13 „ | 13 „ | 1 1 0 |
| 13052 | 16 „ | 16 „ 13 „ | 18 „ | 1 1 0 |
| 5601 | 16 „ | 16 „ 14 „ | 15 „ | 1 1 0 |
| 6827 | 16 „ | 16 „ 14 „ | 17 „ | 1 1 0 |
| 4494 | 16 „ | 16 „ 14 „ | 14 „ | 1 1 0 |
| 3548 | 16 „ | 16 „ 15 „ | 19½ „ | 1 1 0 |
| 6677 | 16 „ | 16½ „ 13½ „ | 13½ „ | 1 1 0 |
| 9645 | 16 „ | 16½ „ 15½ „ | 12½ „ | 1 1 0 |
| 4434 | 16 „ | 17½ „ 14 „ | 14 „ | 1 1 0 |
| 6469 | 16 „ | 18 „ 14 „ | 15 „ | 1 1 0 |
| 9015 | 16 „ | 18 „ 14 „ | 18½ „ | 1 1 0 |
| 4327 | 16 „ | 18 „ 15 „ | 16½ „ | 1 1 0 |
| 8049* | 16 „ | 18 „ 15 „ | 17⅝ „ | 1 1 0 |
| 6137 | 16 „ | 20½ „ 13½ „ | 13½ „ | 1 1 0 |
| 5918 | 17 „ | 18 „ 14 „ | 14 or 17 „ | 1 3 0 |
| 5053 | 17 „ | 19⅝ „ 12 „ | 14½ „ | 1 3 0 |
| 7548 | 17 „ | 20 „ 13 „ | 15 „ | 1 3 0 |
| 6468 | 17 „ | 20 „ 16 „ | 15½ „ | 1 3 0 |
| 4316B | 17 „ | 21 „ 14 „ | 14 „ | 1 3 0 |
| 7975 | 17 „ | 21 „ 15 „ | 14½ „ | 1 3 0 |
| 13459 | 17 „ | 21½ „ 13½ „ | 15 „ | 1 3 0 |
| 12990 | 18 „ | 18 „ 15 „ | 15 or 19 „ | 1 5 0 |
| 7135 | 18 „ | 18½ „ 15 „ | 13 „ | 1 5 0 |
| 10221 | 18 „ | 18 „ 16 „ | 19⅝ „ | 1 5 0 |
| 4506 | 18 „ | 20 „ 13 „ | 19½ „ | 1 5 0 |
| 6470 | 18 „ | 20 „ 13 „ | 15 „ | 1 5 0 |
| 6818 | 18 „ | 20 „ 13½ „ | 17½ „ | 1 5 0 |
| 4083 | 18 „ | 20 „ 15 „ | 16 „ | 1 5 0 |
| 5306 | 18 „ | 20½ „ 14 „ | 13½ „ | 1 5 0 |
| 13295 | 18 „ | 20½ „ 14 „ | 19½ „ | 1 5 0 |
| 7356 | 18 „ | 20½ „ 13½ „ | 13 „ | 1 5 0 |
| 4569 | 18 „ | 21 „ 14 „ | 18 „ | 1 5 0 |
| 3628 | 18 „ | 21 „ 15 „ | 16 „ | 1 5 0 |
| 7640 | 18 „ | 22 „ 13½ „ | 13½ „ | 1 5 0 |
| 7971* | 20 „ | 20 „ 15 „ | 18 „ | 1 11 0 |

*Patterns marked * have Sockets at back to connect to Retorts; all the others are flanged. Patterns marked B have curved bottoms.* 191

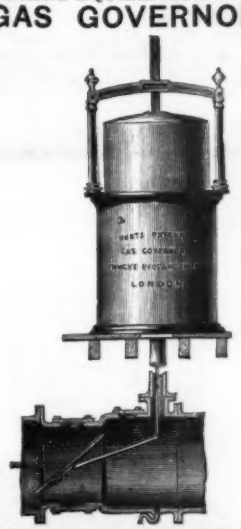
**Mouthpieces with D Lids for D Retorts.**

| Pattern No. | Dimensions of Mouth. | Internal Dimension of Retort. | Length of Mouthpiece. | PRICE, Lid and Fittings without Mouthpiece. |
|---|---|---|---|---|
| 12292 | 15½ × 13 ins. | 15½ × 13 ins. | 12 ins. | £1 2 0 |
| 9967 | 16 „ 14 „ | 16 „ 14 „ | 15½ „ | 1 3 0 |
| 13574 | 16⅝ „ 18⅝ „ | 16⅝ „ 18⅝ „ | 12½ „ | 1 4 0 |
| 9899 | 18 „ 12 „ | 18 „ 12 „ | 14 „ | 1 4 0 |
| 12980 | 16 „ 16 „ | 16 „ 16 „ | 18 „ | 1 6 0 |
| 13900 | 18 „ 13⅝ „ | 18 „ 13 „ | 15 „ | 1 6 0 |
| 9912 | 18 „ 13½ „ | 18 „ 13½ „ | 17 „ | 1 6 0 |
| 9962 | 18 „ 13½ „ | 18 „ 13½ „ | 16 „ | 1 6 0 |
| 10982 | 18 „ 18½ „ | 18 „ 14 „ | 15 „ | 1 6 0 |
| 11098 | 18 „ 14 „ | 18 „ 14 „ | 12 „ | 1 6 0 |
| 9492 | 20 „ 13 „ | 20 „ 13 „ | 15 „ | 1 10 0 |
| 9208 | 20 „ 13 „ | 20 „ 13 „ | 19½ „ | 1 10 0 |
| 10251 | 20 „ 13 „ | 20 „ 13 „ | 15½ „ | 1 10 0 |
| 12964 | 20 „ 13 „ | 20 „ 13 „ | 13½ „ | 1 10 0 |
| 9909 | 20 „ 13⅝ „ | 20 „ 13⅝ „ | 17 „ | 1 10 0 |
| 12969 | 19½ „ 15½ „ | 19½ „ 15½ „ | 14 „ | 1 11 0 |
| 13781 { Front. | 20 „ 15 „ | 21 „ 15 „ | 15 „ | 1 11 0 |
| 13781 { Back. | 21 „ 15 „ | | | |
| 7692 | 21 „ 15½ „ | 21 „ 15½ „ | 16 „ | 1 11 0 |
| 12978 | 20 „ 16 „ | 20 „ 16 „ | 17 „ | 1 11 0 |
| 13252 | 20 „ 16 „ | 20 „ 16 „ | 18 „ | 1 11 0 |
| 13220 | 21 „ 15 „ | 21 „ 15 „ | 17 „ | 1 11 0 |
| 8977 | 21½ „ 18⅝ „ | 21½ „ 18⅝ „ | 18⅝ „ | 1 11 0 |
| 8976 | 21½ „ 18⅝ „ | 21½ „ 13⅝ „ | 18⅝ „ | 1 12 0 |
| 10497 | 21½ „ 13⅝ „ | 21 „ 13½ „ | 18⅝ „ | 1 12 0 |
| 8037 | 21½ „ 13½ „ | 21½ „ 13⅝ „ | 18⅝ „ | 1 12 0 |
| 9908 | 21½ „ 13½ „ | 21½ „ 13½ „ | 15 „ | 1 12 0 |
| 10404 | 21½ „ 13⅝ „ | 22 „ 14 „ | 18½ „ | 1 12 0 |
| 12410 | 21½ „ 13⅝ „ | 22 „ 14 „ | 12 „ | 1 12 0 |
| 13822 | 21½ „ 18⅝ „ | 23 „ 14 „ | 15 „ | 1 12 0 |
| 10515 | 23½ „ 12⅝ „ | 23½ „ 12⅝ „ | 13½ „ | 1 12 0 |
| 7924 | 24 „ 14 „ | 24 „ 14 „ | 15⅝ „ | 1 13 0 |
| 13807 | 24 „ 15½ „ | 24 „ 15½ „ | 16 „ | 1 14 0 |
| 9015B | 25 „ 14 „ | 25 „ 14 „ | 12½ „ | 1 14 0 |
| 10932 | 25 „ 14 „ | 24 „ 14 „ | 13½ „ | 1 15 0 |
| 12944B | 22 „ 16 „ | 22 „ 16 „ | 16 „ | 1 15 0 |

*Patterns marked B have curved bottoms.* 192

HUNT'S PATENT EQUILIBRIUM DIRECT MAIN

## GAS GOVERNOR.




In this Governor a throttle valve is substituted for the ordinary suspended cone; all external communication being avoided by placing the lever or radius arm inside the valve chamber upon the disc.

The disc is carried upon steel centres, upon which it is accurately balanced.

| | | | | | |
|---|---|---|---|---|---|
| 4 ins. .. £17 0 | 8 ins. .. £25 0 | 14 ins. .. £42 0 | 20 ins. .. £80 0 | | |
| 5 „ .. 20 0 | 10 „ .. 33 0 | 16 „ .. 46 0 | 24 „ .. 72 0 | | |
| 6 „ .. 22 10 | 12 „ .. 38 0 | 18 .. 50 0 | 36 „ .. 130 0 | | |

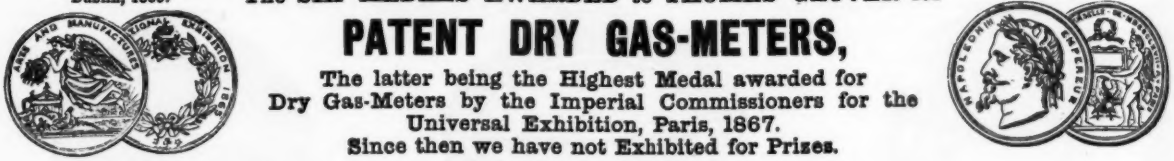
195

[*Copyright, Entered at Stationers' Hall.*

## ORIGINAL MAKERS.

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.



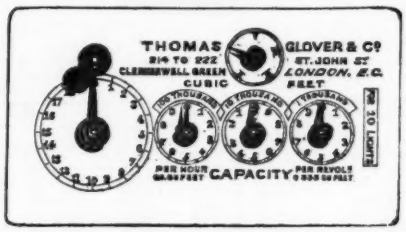
The SIX MEDALS AWARDED to THOMAS GLOVER for

**PATENT DRY GAS-METERS,**

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.
Since then we have not Exhibited for Prizes.

## PREPAYMENT METERS.

By setting the Hand of the large Circle on the left-hand side of the Dial, Gas Companies can allow a Consumer to receive only


THOMAS GLOVER & Co
214 TO 222 CLERKENWELL GREEN
ST. JOHN ST LONDON, E.C.
CUBIC FEET
PER HOUR CAPACITY PER REVOLVE
PER 100 LIGHTS

the exact amount of Gas they have received prepayment for, and thus avoid the unpleasantness of asking users for a deposit.

**ALSO MAKERS OF BROWNHILL'S PREPAYMENT ATTACHMENTS.**

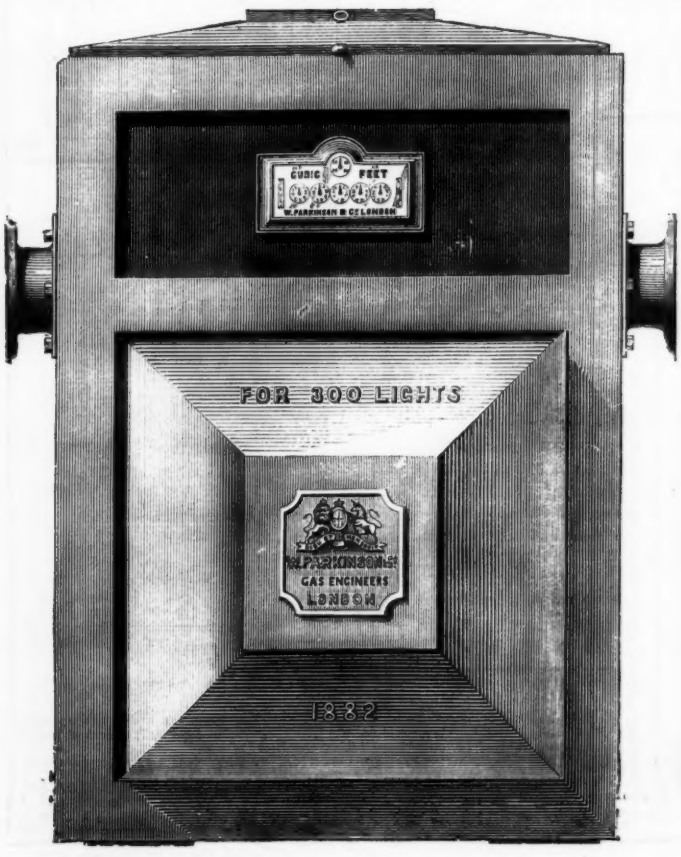
# THOMAS GLOVER & CO.,

**DRY GAS-METER MANUFACTURERS,**

**214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.**

TELEGRAPHIC ADDRESS: "GOTHIC LONDON"

# W. PARKINSON & CO.,




MANUFACTURERS OF

## DRY METERS

OF THE

**VERY BEST QUALITY.**

The DIAPHRAGMS are of the Finest PERSIAN SHEEP SKINS.

The CASES are of the Best CHARCOAL-TINNED PLATES.

## WET METERS,

*With PATENT THREE-PARTITION DRUMS.*

STATION METERS & GOVERNORS,
PRESSURE & EXHAUST REGISTERS.
MOTIVE POWER METERS,
Test Gasholders, Experimental Apparatus, &c.
PRESSURE GAUGES OF EVERY DESCRIPTION.

NEW ILLUSTRATED CATALOGUE & PRICE LIST
Sent post free on application.

GOLD & SILVER MEDALS,
International Health Exhibition, London, 1884.
SILVER MEDAL,
International Inventions Exhibition, 1885.

**COTTAGE LANE, CITY ROAD,**
**LONDON.**

Telegraphic Address: "INDEX LONDON."

## CONTENTS.


EDITORIAL NOTES—*Gas, Lighting, &c.*:— PAGE
The New Departure . . . 149
The London County Council . . . 150
Speciality in Engineering . . . 150
Saccharine—A Question of International Science . . . 151
*Water and Sanitary Affairs*:—
The Water Supply of the Metropolis . . . 152
"Constant Supply" Case in the West Middlesex Water Company's District . . . 152
ESSAYS, COMMENTARIES, AND REVIEWS:—
The Affairs of The Gas Institute . . . 153
Gas and Water Companies in the Stock Market . . . 153
Electric Lighting Memoranda . . . 153
The Three-Lift Holder for the Sydney Gas-Works . . . 154
Brussels Municipal Gas Supply . . . 154
The Relation of Water Supply and Disease . . . 154
Water Bills for 1889 . . . 155
NOTES:—
Rope Gearing . . . 156
Testing Gas for Benzene Vapour . . . 156
Waste Water Prevention . . . 156
Coke Breeze and Cement Concrete . . . 157
COMMUNICATED ARTICLE:—
The Chemistry of Illuminating Gas. By Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S. . . . 157
TECHNICAL RECORD:—
Sir Frederick Bramwell on Motive Power . . . 158
CORRESPONDENCE:—
Estimating the Comparative Value of Coal . . . 159
The Gas Institute . . . 159
Mr. Bray and The Gas Institute . . . 160
Public Lighting by Oil . . . 160
West's Wire-Rope Stoking Machinery . . . 160
Gas Supply in Japan . . . 160
LEGAL INTELLIGENCE:—
High Court of Justice—Queen's Bench Division—Bristol Water-Works Company *v.* The Mayor, &c., of Bristol . . . 161
Middlesex Sessions—Appeal by the East London Water-Works Company . . . 161
Dublin Recorder's Court—Wrongfully Disconnecting a Gas-Meter . . . 161
Kensington Petty Sessions—A Water Company's Refusal to Furnish a Constant Supply . . . 162
MISCELLANEOUS NEWS:—
Mr. Ellis Lever and the Leeds Corporation Gas Coal Contracts . . . 162
The London County Council and Gas and Water Questions . . . 162
Meeting of the European Gas Company, Limited . . . 163
Bordeaux Gas Company . . . 163
Bristol United Gaslight Company—Dissension among the Directors . . . 164
Widnes Local Board Gas Supply—The Dinsmore Gas Process . . . 164
Leeds Corporation Gas Supply—Meter Testing; The Quality of the Gas . . . 164
Proposed Purchase of the Brierley Hill Gas-Works by the Local Board . . . 164
Bingley Improvement Commissioners Gas Supply—Cost of Manufacture . . . 165
Walsall Corporation Gas Supply—Differential Prices for Gas . . . 165
Stalybridge Corporation Gas Supply—The Quality of the Gas; The Coal Contracts . . . 165
The Electric Lighting Experiment at Leamington—The Contract to be Determined . . . 166
Metropolis Water Supply . . . 167
Cheltenham Corporation Water Supply . . . 167
The Bolton Corporation Water Undertaking . . . 167
Coventry Corporation Water Supply—The Proposed New Works . . . 167
Notes from Scotland . . . 168
Current Sales of Gas Products . . . 169
Gas and Water Companies' Stock and Share List . . . 169
The Use of the Divining Rod near Hastings, 151—London County Council, 151—Water Companies and Plumbers, 151—Madame Alting-Mees in Belgium, 151—Electric Lighting by Storeage Batteries in Germany, 151—Visit of Engineers to the Blackburn Gas-Works, 154—The Gas, Water, and General Investment Trust, Limited, 154—Presentation to Mr. J. F. Bromley, 156—The Use of Gas-Engines in Manchester, 156—Death of Sir Henry Hunt, 157—Watertight Concrete, 157—Recovery of Sulphur from Alkali Waste, 157—The Sanitary Institute, 158—Gas at the Forthcoming Paris Exhibition, 158—The Effect of Fog on the Consumption of Gas in Birmingham, 159—Liverpool Engineering Society, 159—Swansea Corporation Water Supply, 160—The Quality of Salford Gas, 160—Ripon Corporation Gas and Water Supply, 160—Improved Gas and Coke Manufacturing Syndicate, Limited, 162—The Alleged Lead-Poisoning by the Bradford Corporation Water, 162—Northern Coal Trade, 162—Rastrick Water Company and the Local Board, 162—Cheltenham Water Supply, 165—The Gas and Water Committee of the City Corporation, 166—Electric Lighting at Reading, 166—The Water Supply of Long Eaton, Stapleford, and Sandiacre, 166—Electric Lighting at Swansea, 166—The Barrow Corporation Water Scheme, 168—The Artesian Well of the Gainsborough Local Board, 168—Morley Corporation and the Gas Company, 169—The Proposed Extension of Burnley, 169—The Electric Lighting at Barnet, 169—Boring for Water in the Thames Valley at Windsor, 169—Bell's Asbestos Company, Limited, 170—An Electric Light Company for Newcastle, 170—The Progress of the Vyrnwy Water-Works, 170—The Dundee Gas-Works *Employes'* Festival, 170—Projected Additional Water Supply for Stafford, 170.



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# THE JOURNAL OF GAS LIGHTING,
## WATER SUPPLY, & SANITARY IMPROVEMENT.

*TUESDAY, JANUARY 22, 1889.*


### THE NEW DEPARTURE.

It was stated in a recent issue of the JOURNAL, in the course of a discussion of the affairs of The Gas Institute, that the members of Council who have seceded from that body and from the Institute intended to meet and consider the advisability of forming a new organization representative of the gas industry of the country, which should be free from the weakness that has brought about the disintegration of the old. This meeting took place on Saturday at the Westminster Palace Hotel, and was well attended. It was confined to the late members of Council; and we understand that it resulted in the unanimous adoption of the following resolution—"That "a National and Representative Organization is desirable for "the Advancement of The Gas Industry." A Provisional Committee of gas engineers and managers was started, with Mr. A. Colson, of Leicester, as Honorary Secretary, to carry the resolution into effect; in which enterprise, it is scarcely necessary to say, we heartily wish them success, convinced as we are that their's is a good cause. We do not entertain the slightest fear of a happy termination to this effort. It is much to be regretted that the undertaking thus inaugurated marks a division in the ranks of those who are identified with the great gas industry of this country; but that is unavoidable for the present, although there is every reason to hope that this aspect of the matter will prove to be temporary, while the good effects of the new movement will be lasting. Gas engineers and managers are not by any means the first of the many orders and classes existing in civilized communities in which definite causes of division have shown themselves, with the consequent requirement for individuals to decide for one of two sides. Sometimes the division is permanent; but there is no good reason to suppose that such will be the case in the present instance. Of course, when cleavage first takes place, there is of necessity some disturbance, and more or less of conflict in the appearance of the processes of separation and re-arrangement. Personal susceptibilities are liable to be injured in the development of two parties where previously only one existed; but, with good temper on both sides, and absence of all avoidable sources of irritation, these heal in time, and amity is restored under the new dispensation. There is no reason why this consummation should not be realized in respect of the new organization for representing the gas industry. At present there is obvious disagreement; but there need be no animosity. If any such spirit exists, it is in a quarter whose real insignificance will be very speedily demonstrated.

The need for a truly representative Association exhibiting the importance and character of the gas industry was never greater than at present. This is a simple axiom that must be accepted without question. Up to a recent date, the industry had such an organization, which, if not absolutely perfect in constitution, might have been improved in any desired respect by agreement among those who had its best interests at heart. Owing to causes which have been too recently discussed in our columns to need repetition here, the character of The Gas Institute was suddenly changed; and it lost its representative quality, which was its best feature. Those who can argue that The Gas Institute is now a representative body deliberately close their eyes to facts; but facts, as the proverb declares, are stubborn things. As well might one venture to deny the existence of the sun at noon-day as to assert that the crumbling Institute, with its fractional governing body, is now representative of the gas industry of this country. It is much more reasonable to argue that there is no Institute—that only the name and not the thing endures at the present moment. It was open to those in temporary authority, when the Institute first lost, or was threatened with the loss of, its most precious representative character—its sole valuable property—to take instant steps for the recovery of this quality. For some unknown reason, which it would be idle to inquire into now, the authorities in question took a different course. A few of them, constituting an accidental majority of the fragmentary governing body, saw fit to strike out a line of their own, involving the sacrifice of the opportunity of recovering what was lost. By so acting, they converted the then temporary loss into an irrecoverable one. It is useless to cry over spilt milk. The mischief was done from the instant that a compact group of members of the old Institute Council took to think of themselves as masters of the situation. They had their opportunity; and they threw it away. It is our only quarrel with them. Individually, we believe the men who closed the way for The Gas Institute reverting to its pristine standard of universality to be incapable of assuming that they were authorized by the general body of members to do what they pleased with the organization. Collectively, however, that is just what they have done; and we believe they will repent it, if they do not even now.

We sympathize warmly with those who would infinitely have preferred the rehabilitation of the old Institute, howsoever greatly modified in rules and constitution, to any new Association, however promising. It is certain that nobody feels this sentiment more strongly than the very men who have inaugurated the new movement. There was but one way, however,

in which the Institute could have been righted. Trade influence was the rock upon which it split, as everbody admits. A body, composed in the main of salaried and professional men, was poisoned by some of the worst influences that could possibly emanate from trade rivalry and rancour. There was but one cure—the radical one of cutting out the canker. Yet to do this and preserve the organization was impossible. The evil was so intertwined with the other substance of the body that the only way to get rid of it was to kill the body, and revive it without the portion of the constituency that had proved to be so mischievous. There is no mistaking the procedure. To get rid of the trading element in its membership—which, be it remembered, did not originally belong to the organization, but was admitted comparatively recently—was the only way to cure its mortal injury; and there was no method of effecting this short of dissolution and reconstitution. If there had been an alternative course, this would have been recommended publicly during the months when the fate of the Institute hung in the balance. No such course was suggested, because nothing to the purpose had occurred to the mind of one member of the Institute. Dissolution and reconstitution was the policy of the late President, Mr. Woodall, with the view of restoring the representative character of the Institute. His advice was rejected—not by the members generally, who never had an opportunity of deciding between it and another policy—but by the arbitrary action of a handful of members of the Council.

Here, then, is the line of cleavage between the positions of the late and the present members of the old Gas Institute Council; and it is for all the other members of the profession to elect on which side they will stand. We do not address any arguments to such as pretend to believe that The Gas Institute is now fairly representative of the gas industry; for that would be wasted labour. For the rest, who constitute the majority, the divergence of the two courses is clear. On the one hand stand those who have had the opportunity of making the Institute representative once more, and have lost it; on the other are to be found those who have determined to start afresh, with no other aim than to lay the foundation of an organization which shall be worthily representative of the great industry to which their life work is devoted, and to which they are proud to belong. They have no other policy, no other desire. All who can assist will be welcomed. The new Association will be what its members choose to make it; and now is the time to take measures for ensuring that, so far as human prescience can avert it, there shall be no congenital weakness in the new body to develop disease when it shall arrive at an age for vigorous work for the good of the industry, for the advancement of its members, and for the benefit of the community at large.

## THE LONDON COUNTY COUNCIL.

The first County Council for London was chosen last week; the event, although marking a revolution in Metropolitan self-government, creating little interest and less excitement. The long-established indifference of the inhabitants of London and its suburbs to all matters of local politics was not to be dispelled by such an alteration of their circumstances as ratepayers; and the poll in most districts was small. Notwithstanding the perfervid attempts of a few of the evening newspapers to manufacture policies for the different candidates, and to instruct them and the voters as to the points of municipal politics which they should or should not hold, the election went almost entirely upon personal and party lines. Broadly speaking, the only clear idea that such of the ratepayers as took the trouble to vote had to guide their choice between the generally multifarious candidates for their suffrages was hostility to the Metropolitan Board of Works. There was almost a clean sweep of these gentlemen; the solicitation of the ratepayers to prevent anything like a resurrection of the "old gang" (as the members of the Board were contemptuously called) under a new name, being responsible for the undeserved rejection of several very worthy aspirants whose only fault was that they had been upon the old Board. Some of these outcasts on account of the sins of others have complained bitterly of the injustice of their treatment; but the rough retribution of a popular vote does not discriminate very nicely between culprits deserving of its condemnation and those who have only been associated with them. "If you did no wrong yourself, you failed to "detect what was going on under your very nose, and are "therefore incompetent as a guardian of the public interest," is the message of the electors to the discarded members of the Metropolitan Board. When this or some other personal questions did not come into consideration, the chances of the candidates depended upon the recommendations of the different party organizations, because most of them were wholly unknown in the districts which they sought to represent. The net result of the election is the return of an executive body, the nature and extent of whose powers is scarcely understood, principally composed of new men, who may or may not do good work in the future. Most of them escaped from placing on record any very binding pledges as to their intentions; but, as will be seen from the report in another column, that self-appointed inquisitor, the Editor of the *Pall Mall Gazette*, contrived to extract more or less categorical declarations from some of the candidates. We record what was stated in response to the somewhat vague questions relating to the gas and water supply and the coal dues; but none of these matters, with the possible exception in some places of the last, had anything to do with the candidates' prospects. It is to be taken for granted that the Earl of Rosebery will be the first Chairman of the Council; and the same section of the London evening press that has tried to work the election seeks to put Mr. J. F. B. Firth, M.P., into the vice-chairmanship, which may be a paid post. There are people so uncharitable as to hint that a comfortable paid appointment for himself has never been outside Mr. Firth's plans for the reform of London government. Upon this point, however, we are not able to offer an opinion; and the insinuation may have been only the outcome of the fear and hatred with which it is well known that the Corporation of the City have regarded Mr. Firth for many years. It is at least certain that if Mr. Firth is made Vice-Chairman with a snug salary, there will be many smiles and winks between the Guildhall and Spring Gardens over the news.

## SACCHARINE—A QUESTION OF INTERNATIONAL SCIENCE.

The controversy respecting the salutary qualities, or the reverse, of saccharine, which was summed up in the statement of Messrs. Wilson, Salamon, and Co., published in last week's Journal, is one of those remarkable incidents of modern life which lead people to think lightly of science. Here is a product, the nature of which must be capable of easy determination, subjected to condemnation by one set of scientific judges, while another set recommend it as a beneficent preparation. Neither party to the controversy can be described as disinterested; but no such claim is advanced by Dr. Fahlberg, the discoverer of the compound, and his agents. They do not pretend to be other than they are—the most interested parties to the question of the right of saccharine to be regarded as an ordinary article of commerce. The other side are not so obviously inspired. Messrs. Wilson and Co. would have the world believe that the mere desire of the French Government to exclude an article of commerce from France, for revenue reasons, is sufficient inducement to French lights of science to fabricate a charge of unwholesomeness against the commodity. Although no direct mention of the point is made, it may also be inferred without much difficulty that the fact of saccharine being a German production is not believed to have been overlooked by its French enemies. The comparatively candid attitude taken up by the British Government with regard to the use of saccharine in brewing is evidently not such a bitter offence to its manufacturers (although they naturally think it a blunder) as the sweeping French condemnation of the product for one ostensible reason, while in reality it is objected to on other accounts. It is obvious, moreover, that the sale of saccharine everywhere is likely to suffer unless the reports as to its deleterious effects upon the human body which Messrs. Wilson and Co. trace to France can be fully met. The incident as it stands is not complimentary to science. We know that scientific experts in law cases show a wonderful aptitude for reconciling science, which is nothing if not indifferent to persons, with the wishes of their paymasters; but if an ostensibly independent body of professedly scientific opinion is to be swayed in the way stated by Messrs. Wilson and Co., with reference to the French chemists, the world will think but lightly of it. Men of science are but human after all; and it is idle to expect them in every case to rise superior to the considerations that affect the actions and opinions of their compatriots of other callings. Chauvinism is a weakness which survives in many cases the most absorbed devotion to the search after abstract truth. Not long ago the adoption by an International Congress of the meridian of Greenwich as the prime meridian for maps and charts of all nations was prevented by French opposition, although

desired by the representatives of all but a small proportion of the trade of the world. We see very much the same feeling manifested in connection with such an apparently indifferent subject as the standard of light. The French cling to their Carcel, with a lingering regard for the Violle unit, which neither they nor anybody else can use. The Germans cannot understand the objections which Mr. Dibdin and others find to the Hefner-Alteneck standard. English photometrists, on the other hand, seem to be "going solid" in favour of the pentane standard. How is it possible to explain these divergencies of opinion in regard to such a clear and plain issue? All these divergent nations of photometrists are perfectly honest in their views. But the fact remains that the French prefer a French standard which nobody out of the Latin union likes; the Germans praise a unit that is never used out of Germany; and the English have their own selection. It is evident that in valuing the personal equation which has to be allowed for in estimating the accuracy of an observer's work, the factor of nationality must not be overlooked.

### SPECIALITY IN ENGINEERING.

In the course of his address to the new Institution of Electrical Engineers, Sir William Thomson said something with reference to the specialism of the day which will repay consideration. The very existence of an Institution of Electrical Engineers is a suggestive fact. Not long ago, as the life of nations is reckoned, there was hardly such a thing as engineering recognized as a distinct calling. The early engineers came to their profession by the way of the millwright or stonemason, or more rarely from the school of the mathematician and the office of the land agent and surveyor. As Dr. Pole points out in his recently published life of Sir William Siemens, the title engineer is not derived from the word engine, which means a machine. Strictly, the word engineer, applied to the attendant on marine engines and aspired to by locomotive and stationary engine men, is a different word altogether from the word engineer as applied to men like Rennie, Telford, and Stephenson in the past, and to many others who might be named as typical examples of their order in the present. The word engineer as thus applied, is derived from the same root as the words ingenious, ingenuity. These words remind us of the word genius, and direct attention to the common root of all such words, which is "*gen*." This root conveys the idea of giving birth, or production, so that the French rendering *ingenieur*, whence we get our engineer, really means a producer of something from his own innate power. As Dr. Pole puts it: "An engineer is, according to the strict "derivation of the term, anyone who seeks in his mind, who "sets his mental powers in action, in order to discover or "devise some means of succeeding in a difficult task he may "have to perform." It is desirable to dwell on these explanations, because just now the generic term engineer, which is frequently popularly understood to mean a man in some way connected with engines, is being made use of and fractionated in a truly remarkable manner; so that it is not at all improbable that, unless proper reasons should be forthcoming, the public may refuse to recognize the applicability of the word in regard to some of its modern specializations. Properly speaking, there is scarcely such a person as an engineer—that is, a man to whom the description may be fitly applied without further qualification. To quote the old schoolmen, this is a universal that has no real existence. In colloquial language it is permissible to call a man an engineer, just as vaguely as another man may be described as a lawyer. The definition is too large, however, to possess more than a temporary and elusive meaning. A lawyer is anything from the Lord Chancellor down to the smallest and youngest "admitted "man." So likewise an engineer in popular parlance may mean the President of the Institution of Civil Engineers, or the driver of the machinery of a penny steamboat. There is need of finer distinctions now-a-days than were necessary in such a case as Smiles's collection into one volume of the biographies of the early engineers. Now we have to distribute engineers according to their specialities into civil, mechanical, hydraulic, sanitary, gas, municipal, marine, electrical, and possibly other divisions. Yet, although there is not much affinity at a first glance between a sanitary or a gas and an electrical engineer, it is nevertheless true, as Sir William Thomson pointed out, that specialism must be mollified by universality in the making of a perfect engineer. Darwin demonstrated that all the numerous varieties of the pigeon known to fanciers are referable to, and resolvable into, one common origin; similarly engineers are of one common origin, whatever division they may belong to. They must all in the end prove their claim to the title by their power of originating or producing. To do this they must learn many things besides those that constitute their specialty, although in this they should strive to be supreme authorities. The mechanical engineer must not be wholly ignorant of the properties and uses of bricks and mortar. The civil engineer should be no incompetent architect; and it will be all the better for the electrical engineer if he knows something about gas, and for the gas engineer if he is not altogether at a loss with regard to the fundamentals of electric lighting. The objection that life is too short for the learning of all these subjects by any one individual is summarily disposed of by Sir W. Thomson. If the surroundings and developments and correlations of an art are studied, he declares that the art itself will become easier to the student. "I am perfectly sure," says this great authority, "that if a youth is qualified in other departments, "the mere addition of electricity to the education of a com- "petent engineer will not take so very long a time." This remark of course applies to the groundwork, or what may be called the educational part of the study. To take up with any branch of engineering as a specialty is to find in it sufficient occupation for the labours of a lifetime, during which the true student will confess that he never ceases to learn something fresh, and that the more he knows the more remains beyond him.

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London County Council.—Last week we gave a list of the few candidates for election on the London County Council, in whom our readers may be supposed to be particularly interested. Four only of these were elected—Mr. W. C. Parkinson, at the head of the poll for North Islington; Mr. Charles Horsley, J.P., for East Islington; Mr. James Beal, for Fulham; and Mr. J. M'Dougall, for the Poplar division of the Tower Hamlets.

The Use of the Divining-Rod near Hastings.—The confidence of those who believed in the ultimate success of the "water diviner's" operations on the site of the new Hastings workhouse a short time since must be somewhat shaken by the results of the boring. It was predicted that water would be found at from 60 to 70 feet below the surface; but although the sinking has been carried to a depth of 100 feet, no water has been met with.

Water Companies and Plumbers.—The Directors of the New River Company have issued a circular in which they inform all applicants who desire to have their names placed on the list of recommended plumbers printed on the back of the notices served by the Company, that it will be necessary for them to obtain certificates from the Plumbers' Company that they are efficient workmen, and registered by that Company. This is the first action of the kind taken by the London Water Companies.

Madame Alting-Mees in Belgium.—During the week ending the 12th inst., Madame Alting-Mees held daily lectures on cooking by gas in the Belgian "Black Country"—a daring experiment, says a correspondent, when the price of coal at the pit's mouth is remembered, and yet a successful one. The subject was entirely new to these audiences; but, having mastered the pet dishes of the various towns, Madame Alting-Mees took the housewives by storm, by showing them the rapidity and certainty with which familiar and every-day dinners could be cooked by gas. Small inexpensive "National" roasters and hot plates were used, as well as those of well-known English makers. These lectures were continued during last week in the neighbourhood of Mons.

Electric Lighting by Storeage Batteries in Germany.—The Berlin correspondent of *Industries*, writing on the 14th inst., says: "A company is in course of formation in Berlin, with a capital of £100,000, for the manufacture of storeage cells and their supply to consumers. The Company propose to acquire a large tract of building land in the south-west district of Berlin, on which they will erect their works. These are to comprise two distinct departments—one devoted exclusively to the manufacture of accumulators, and the other to the charging and maintenance of accumulators. These are to be of a totally novel type, devised by Herr Welcker, an Electrical Engineer of Berlin; and it is claimed for these batteries that their storeage capacity, as compared with their bulk and weight, far surpasses anything hitherto accomplished. It is mainly on the strength of this alleged superiority that is based the method according to which the Company will utilize the new invention. They propose to organize a service of carts, which would take the charged cells to their customers, and take back the discharged cells to be re-charged at the works. They hope to do a good business with private houses situated in the south-east and south-west portions of the town, which are too far away from the central stations to obtain their supply from them. I doubt, however, whether the enterprise, even if it should be started on a large scale, and if all that the inventor claims for his accumulator were true, could possibly pay. The process of manufacturing the plates is a secret; and the inventor hopes to keep it to himself, as the plates are said to explode when heated, which circumstance he thinks will act as a deterrent to over-curious investigators."

# Water and Sanitary Affairs.

A PARLIAMENTARY RETURN, moved for by Mr. J. F. B. Firth, made its appearance last week. In addition to various particulars derived from the accounts of the London Water Companies, the return was intended to include an estimate of the daily waste in connection with the water supply of the Metropolis. Six out of the eight Companies declare the impossibility of giving an estimate that can be at all relied upon. The remaining two have attempted the task; the East London estimating the waste in their district at 10 million gallons per day, and the Grand Junction at 4 or 5 million gallons. The figures are large; these 14 or 15 million gallons alone representing 9 per cent. of the entire supply given by the London Companies. If the estimate is fairly correct, and the same waste goes on all over the districts, there is a daily loss of more than 43 million gallons—a quantity exceeding the combined daily supply of the Grand Junction, the West Middlesex, and the Chelsea Companies. We are taking the figures for 1887; that being the year to which the parliamentary return has reference. It seems next to incredible that the supply furnished by three of the Companies should be virtually neutralized by the waste which is affecting all. That more than one-fourth the entire water supply of the Metropolis is thus thrown away, is a conclusion which we would not readily accept. It is a little singular, and gives an appearance of correctness to the estimate, that the percentage of waste is substantially the same in the case of the two Companies who have ventured to give a return; each ranging between 26 and 27 per cent. There are two aspects to this question. In the first place, if anything like this waste is going on, it affords a species of reserve for the benefit of the Companies. To stop this waste, or an appreciable portion of it, will be to enlarge the quantity available for use. The result will be equivalent to sinking fresh wells, or employing additional engine power. In the next place, the cry that a fresh supply must be introduced from a distance, not merely for the sake of quality, but to obtain a sufficient quantity, will be met by the fact that London is already overdosed with water, and is recklessly wasting a large portion of the supply. As lending some force to the argument for economy, we might ask why should the population in the Chelsea district receive 37 gallons per head each day, while those in the West Middlesex district are satisfied with 29 gallons? At the latter rate the Chelsea Company might save one-fifth of their supply, or, in other words, become able to meet the wants of an additional 74,000 in their population, without sending any more water into the mains than they did in 1887. During the last ten years, the increase in the population of the Chelsea district has only averaged 3664 per annum. If we suppose the average increase for the next ten years to be double this amount, the present supply would still be equal to the demand, if it were given at the rate which the West Middlesex Company find sufficient. This is simply comparing one Company with another, without considering that even the better of the two is doubtless subject to some degree of waste. It is quite probable (and the experience of the Lambeth Company seems to prove it) that a daily supply of 20 gallons per head is all that London needs. Anything beyond this is due to actual waste, much of which may be called wilful on the part of the consumers. As the average supply in 1887 was rather more than 30 gallons per head, we are led to conclude that one-third the present supply is superfluous. Could this excess be turned to profitable account, London would be in no risk of scarcity in respect to water; the present volume being ample for a population exceeding eight millions—a point not likely to be reached, even in the extensive area occupied by the Water Companies, for more than twenty years to come. Such economy may be called theoretical perfection. Still it shows that there is a broad margin in which to improve. Laying aside all exaggeration, the prevention of waste yet appears so vital to the interests of the London Water Companies that we may properly speak of it as a subject which can scarcely receive too much attention at their hands.

A decision for which it is perfectly certain no warrant exists in any Act of Parliament, has just been arrived at by the Kensington Justices in reference to the constant supply. According to this decision, an individual has only to demand a constant supply of water from a Metropolitan Company, and the request must forthwith be granted. Such a demand was made upon the West Middlesex Company by a gentleman residing at Chiswick, who also expected the Company to lay down a pipe 130 yards long, in order that a constant supply might be conveyed to his premises from a main at that distance. The Company were willing for the pipe to be laid and the supply to be drawn, but denied that they were under any obligation in the matter. The applicant having brought his case before the Kensington Bench of Magistrates, sitting in Petty Session, those authorities are said to have "expressed an opinion" that it was the duty of the Company, under the Act, to provide a constant supply when demanded—including such a case as the one then before them. On what this "opinion" was founded does not appear. "The Act," indeed, is mentioned; but assuredly no section of any statute imposes any such "duty" as the Kensington Justices have attached to the West Middlesex Company, and which they seek to enforce by a penalty. As a case is granted for a Superior Court, there is the certainty that the real state of the law will soon be recognized, and this absurd decision swept aside. Supposing it were even obligatory on the Company to give the constant supply to an individual making the demand, it does not follow that they are bound to provide 130 yards of pipe. But the Magistrates must be singularly oblivious of the law not to know that the provision for the constant supply relates to a district, and not to an individual. There are also certain conditions laid down in the statute, of which we hear nothing in this particular instance. In the first place, the "district" has to be selected where the constant supply is to be given, and is to consist of an "area" which shall be "coterminous "with one or more services" of the Company concerned. "Premises," though dignified by the name of "Gunnersbury "College," do not constitute a district. Moreover, it does not rest with any individual to make the demand. This must emanate from a Metropolitan Authority, or the Local Government Board. Either the one or the other may be moved by complaints emanating from the inhabitants of a locality, and doubtless a single individual may complain; but we are not aware that the law anywhere enables an individual to go before a Bench of Magistrates and obtain their authority that he shall have a constant supply for his own especial delectation. There are also certain regulations to be observed in the giving of notices preliminary to the constant supply; and its actual introduction is made contingent on proper fittings being provided in the houses. Altogether, the proceedings of the Kensington Magistrates seem to have been singularly at variance with the law, and may be said to furnish another example of the erratic nature of "Justices' justice." In striking contrast to this incident, we may refer to the fate of the City parishes which petitioned the Corporation last summer to issue notices calling upon the Water Companies supplying the City to provide a constant supply. The Corporation refused to act; and the petitioners, though representing four City parishes, have no further chance, except to memorialize the Local Government Board—a step which they do not appear to have taken. Another aspect of the water supply question is afforded by the decision of the Middlesex Magistrates at Westminster, last Saturday, quashing Mr. Lushington's conviction of the East London Water-Works Company for refusing to give the constant supply in the absence of a storeage cistern. If an appeal against this judgment should restore Mr. Lushington's conviction (which we do not expect), the result may please the landlords of small house property; but the tenants will find abundant cause for regret, and the original intention of the Legislature will be clearly frustrated.

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IT is reported that Sir Robert Anstruther Dalyell, K.C.I.E., has joined the Board of the Incandescent Gas Light Company.

MR. ALEXANDER ALLAN, of the Bankside Station of the South Metropolitan Gas Company, has been appointed Superintendent of the Effingham Street Station of the Sheffield United Gaslight Company.

THE Directors of The Gaslight and Coke Company will recommend, at the next half-yearly meeting, the payment of a dividend for the past six months at the rate of 13 per cent. per annum, carrying forward £304,703.

As from to-morrow (Wednesday) Lord Balfour of Burleigh will take over the duties of his new position as Parliamentary Secretary to the Board of Trade, in accordance with the announcement publicly made some few weeks since.

MANY of our readers who are personally acquainted with Colonel Sadler, of Middlesbrough, will regret to learn that, while hunting in the neighbourhood of Stockton-on-Tees on Saturday last, he was thrown from his horse, and sustained a fracture of the right arm and a dislocation of the elbow.

# Essays, Commentaries, and Reviews.

## THE AFFAIRS OF THE GAS INSTITUTE.

The chief event of the past week in connection with Gas Institute affairs was the meeting on Saturday of the late members of Council, at which it was unanimously resolved—"That a National and Representative Organization is desirable for the Advancement of the Gas Industry." A Provisional Committee of gas engineers and managers, composed of the gentlemen present at the meeting, and those who have expressed sympathy with its object, with power to add to the number, was formed to carry the resolution into effect. Mr. Alfred Colson, of Leicester, is the Honorary Secretary of this Committee; and invitations are to be issued to a number of gentlemen qualified to be enrolled in it. Acceptance of the resolution is the only test of policy imposed at present. It is understood, however, that exclusion of the trading element will be a cardinal feature of the new organization. When a sufficiently numerous Committee has been formed, a meeting will be held for the discussion of the points of the constitution of the new organization, at which all suggestions will be duly taken note of. Then a small Sub-Committee must be selected for settling the rules, and considering recommendations made to the first meeting; and their report will have to be presented at a second meeting of the Provisional Committee. It will be worth taking some trouble in order to get the foundation properly laid. Though there is no actual need for hurry in making these provisional arrangements, there must not be any avoidable delay in getting matters in shape for the first regular meeting of the new Society.

We publish in our "Correspondence" columns communications more or less relating to the subject from Mr. Samuel Hayward and Mr. George Bray. The former does not call for comment, as it is hardly worth publishing, except to carry out our wish to lay before our readers everything bearing upon the question of the hour. Mr. Bray's effusion, or rather effusions, for the two should be taken together, are characteristic. To refer with complacency to the pamphlet which he issued last June and circulated, not only among gas managers and members of the Institute, as he admits, but also among their employers and paymasters, is quite worthy of Mr. Bray. We are aware that he borrowed for this pamphlet as many of our remarks upon the commission system as suited him, reproduced them without their context, and instead served them up with comments of his own; but nobody but Mr. Bray would glory in such a proceeding. As to his blessing the old Institute a second time in the amazing letter which he asks us to reproduce, that is a dose which Mr. Garnett and his supporters must swallow as best they may. What, one may well ask, would have been said if anybody else had essayed to play the patron in this style? Mr. Bray could not possibly do better service to the new Society than by publishing these letters. All who are afraid of him to the extent of refraining from joining the new organization which he anathematizes, can very well be spared from its roll. It must be a comfortable reflection for the members of the fragmentary Council of the old Institute that they are compelled to accept Mr. Bray's patronage, however much they may dislike him personally. Indeed, they live but to do his will; for as it is arguable that everything they do is *ultra vires* and at their peril, they dare not do anything to offend the only person who cares sufficiently about the matter to set the Court in motion against them. So long as they please Mr. Bray, the old Council may play their game without much fear of legal interruption; but let them disoblige him by showing a spark of independence or resentment at his tyranny, and woe will betide them. It is a case of needs must, when Mr. Bray drives.

## GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 169.)

The past week has been in favour of higher prices in almost all departments of the Stock Exchange—aided by the easier condition of the Money Market, and the greater confidence indulged in with regard to political affairs on the Continent, notwithstanding the renewed outbreak of Boulangism. Good investments for money continue in demand. Business in the Gas market has, on the whole, been somewhat slacker than in the preceding week; but firmness is still the general characteristic. There was some show in the earlier portion of the week of a disposition to realize the profits afforded by recent advances; and the two heavy issues, Gaslight "A" and Imperial Continental, receded a point each. In the case of the former, however, a rapid change set in as soon as it became known that the Company's working for the second half of 1888 had been so good as to admit of their paying a maximum dividend, and (in addition) carrying forward a balance of some £27,000 to the credit of undivided profits. Gaslight "A" at once rose freely; and the closing quotation was 3 higher than Wednesday's price. We make no apology for quoting what we said on the 4th of December last in reference to this subject—viz., "We shall expect that the accounts for 1888, when disclosed, will occasion a feeling of regret to those who have lately been parting with their stock." At that date the quotation of Gaslight "A" was 9½ lower than it is now; and our prediction is probably coming home to some. The other two Metropolitan Companies' accounts are not yet made up; but there is every reason to believe that they will prove correspondingly good. There is no doubt that the Companies have lately been, and are still doing a large business; and as soon as this is realized, there will be a general advance in the price of their stocks. A little business was done last week in South Metropolitan "B;" but nothing in the other two issues. Commercials were not touched at all. In the Suburban and Provincial department, business was quite dead; but Brentford old and new have risen 2 each. In the Foreign division, Imperial Continental is quoted 1 lower; but the prices of actual transactions are no worse. Oriental and Bombay are a little better; and Continental Union rose again. Pará has paid another dividend at the rate of 4 per cent. There has been a great deal more activity in Water, accompanied by general firmness and slight advances whenever quotations have moved.

The daily operations were: On Monday, Gas was firm but quiet; and the only change was a rise of ¼ in Oriental. Water was quite inactive. On Tuesday, the turn was rather against Gas; and Gaslight "A" was once marked "specially" at 257—its quotation, and that of Imperial Continental, falling 1. A little business was done in Water, at good figures. Gas was quite steady on Wednesday; though business was only moderate. Bombay new rose ¼. Water was rather brisk—especially East London, which rose 1. Chelsea also made a similar advance. Transactions in Gas onThursday were very limited; but strength was the rule. Gaslight "A," and both the Brentfords, rose 2 each; and Continental Union partly paid, 1. Water was firm and unchanged. Gas was more active on Friday—especially Gaslight "A," which rose 1, and was done at 263. Prices throughout were good. Water was as before. On Saturday, Gas was quiet, as usual, but quite firm. Water was unusually active; and Lambeth 10 per cents. improved 1.

## ELECTRIC LIGHTING MEMORANDA.

THE DETERMINATION OF THE LEAMINGTON ELECTRIC LIGHTING CONTRACT—AN OBSTACLE IN THE WAY OF ELECTRIC LIGHTING IN PARIS—THE INSTITUTION OF ELECTRICAL ENGINEERS.

It will be seen from the report in another column that the electric lighting of Leamington is not going on very satisfactorily. In fact, if the electric light is to be "the light of the future" anywhere, it will not apparently be in Leamington, where the Corporation have decided to give the Midland Electric Light and Power Company a year's notice to terminate the contract for public lighting. The contractors first attempted to light the Parade with nominally 16-candle incandescent lamps, only for it to be discovered that these lamps somehow fail to give a satisfactory light for the purpose. After the Corporation had grumbled a good deal, the contractors recommended a trial of arc lamps and powerful incandescent lamps; but the effect does not seem to have been good, while the cost of either of the systems favoured by the electricians would be excessive. A charge of £42 per annum for arc lamps, or £30 per annum for 300-candle power (nominal) incandescent lamps, is plainly something that no public authority duly careful of the money of the ratepayers can face; and so the Leamington experiment has gone back to the old system for the remaining period of its existence. There is nothing for it but to record that electricity has failed once more to satisfy the public lighting authority of an English town, in which its advent was hailed with great expectation. The Leamington failure cannot be explained away upon any of the excuses usually depended upon by the partizans of electric lighting. It is true that there has been very considerable dissatisfaction in the town, because the business heads of the Company were not local residents—the undertaking being a Birmingham speculation; but it is difficult to see how this consideration can have affected the lighting. Neither was the failure brought about by any interference on the part of the Gas Company. There was never any question of competition between the Gas Company and the Electric Light Company. The charge for electric lamps was more than double that for gas; and the Corporation and other patrons of the electricians acted as they did purely upon the consideration of taste. They did not like the gas; they thought they should like the electric lamps; and they were prepared to pay for the fancy. It may, of course, be urged that the Leamington failure is due to bad management on the part of the Company, and that the example of the shortcomings of a small country undertaking should not be quoted to the discredit of the method of lighting under other and better auspices. To this argument we may reply that this last collapse is only one of a long series, and that it is ridiculous to look for Kensingtons and Whitehalls everywhere. The inference we draw from these repeated failures of electric lighting in English towns is that English highway authorities are accustomed to reliable lighting by gas. It is a weakness of theirs in some places to accuse street gas-lamps of dimness, forgetting that they can always have more light by paying for it; and they are occasionally so far carried away by prejudice as to grant to electricians double and treble the amount they have been accustomed to pay for gas. The public are also dazzled for a time by the talk of lamps of thousands of candles power. With experience, however, comes the reaction. The new lamps whose brilliancy is so great upon paper are a disappointment in practical working. The drawing of big cheques for inefficient street lighting becomes unfashionable at last; and the electricians who were hailed with banquets receive cold instructions to take themselves off. This is, so far, the history of electric lighting in our English towns, from the first Edison experiment in Holborn in 1882 to Leamington in 1889.

The scheme of the Paris Municipality for establishing a number of concessionary electric lighting companies in various divisions of the French capital, to which repeated references have appeared in these "Memoranda," is reported to be hanging fire. Up to the present time none of the tenders sent in by competitors for the Halles station contract has complied with the regulations laid down by the Commission which drafted the *cahier des chargee;*

and the correspondent of *Industries* remarks that there are not wanting critics to affirm that the delay in getting to work is simply due to the fact that many of these requirements are impracticable, and must be altered before contractors can accept them. This means further inquiry, more commissions, and fresh reports and discussions in the Municipal Council. It will be remembered that this contract is for the district which the Municipality decided to light under their own supervision, so as to serve at the same time as an example to, and a check upon, the other installations. As matters are going now, however, there is not much hope of the Halles installation being ready in time for the opening of the Exhibition; and nobody knows when the others will be started. As in Paris, so in London. There is no difficulty in obtaining electric lighting of a more or less experimental, and therefore defective, order; but to get a perfect installation to work under anything like statutory obligations is not so easy.

The Institution of Electrical Engineers held their first meeting on the 10th inst., at the rooms of the Institution of Civil Engineers, when the President, Sir William Thomson, delivered his inaugural address, which was of a severely technical character. The Institution was formerly known as the Society of Telegraph Engineers and Electricians; and was founded when telegraphy and electro-metallurgy were the only practical applications of electricity. Now that electrical engineering has branched out into so many developments—such as lighting, transmission of power, hauling, &c.—the old designation of the association was found to be too narrow, and there has accordingly been a change of name. The Society appears to be doing well; and by the selection of prominent men as its officers, it is going the right way to impress the newspaper-reading public with a due sense of its importance and the prosperity of the interest with which it is identified.

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THE THREE-LIFT HOLDER FOR THE SYDNEY GAS-WORKS.—With to-day's number of the JOURNAL is given the eighth (and last) plate illustrative of the holder erected last year at the Sydney Gas-Works by Messrs. C. & W. Walker. The description of the details here given, together with the text of the specification that was issued for the erection of the holder, will appear in next week's number.

VISIT OF ENGINEERS TO THE BLACKBURN GAS-WORKS.—On Wednesday last several of the gas engineering and other friends of Mr. S. R. Ogden, accepted that gentleman's invitation to inspect the working of the new stoking machinery driven by steel-wire ropes, recently erected by West's Gas Improvement Company. After refreshments had been partaken of, two separate inspections were made. In all 72 retorts had to be drawn and charged on the occasion; and the party timed the drawing and charging of 24 retorts—this being accomplished in about 21 minutes. Mr. Ogden explained the various parts of the machinery, and stated that it had worked most satisfactorily since it had been started. The members of the party expressed themselves very pleased with what they had seen, and also with the works generally.

THE GAS, WATER, AND GENERAL INVESTMENT TRUST, LIMITED.—The favour in which Trust Companies are held by investors generally has prompted the formation of an undertaking of this kind, with special reference to gas and water concerns. As will be seen by the prospectus which appears in our advertisement columns, the new venture will be under the management of an influential directorate, whose previous experience in conducting joint-stock companies will fully qualify them to deal to the best advantage with the funds to be entrusted to them. The capital is £1,500,000, in £10 shares; but only half of this amount is to be called up at present. The first issue of shares will be at a premium of 5 per cent.; and already more than half the number have been applied for. With the premium capital thus created it is intended to meet the preliminary expenses of the Company; the rest being available for investment. As will be gathered from the title, the scope of the Company's operations will not be restricted to gas and water undertakings; consequently, the capital will be divided among a large number of sound securities, which may be expected to bring to the investor a good return for his money, without subjecting him to the risk of fluctuations in dividend which might attend an investment in a single concern. As exemplifying the success which has attended the formation of Trust Companies, attention may be directed to the fact that the 5 per cent. preferred stock of five of the most important of those at present in existence ranges from 115 to 127; the deferred stock, at prices rising from 115 to 140, paying 6, 6½, and 7 per cent. The system of management which has ensured the success of these Companies will be followed in conducting the Gas, Water, and General Investment Trust, Limited; and, in view of the substantial character of the undertakings to which the attention of the Board will be mainly directed—viz., those for the supply of gas and water—there is every reason for supposing that similar satisfactory results will follow. The first issue of shares will be divided into preferred and deferred stock, in the proportions of three-fifths to two-fifths; the former being entitled to a cumulative preferential dividend of 4½ per cent. per annum, and the latter to the profits remaining after this dividend has been paid. Debenture stock equal in amount to the subscribed capital will be issued. Among the Directors are the Hon. Henry Noel, a member of the Board of The Gaslight and Coke Company, and Mr. J. Boustead, a Director of the Lambeth Water-Works Company. The Secretary is Mr. James A. Kelman.

## BRUSSELS MUNICIPAL GAS SUPPLY.

AN esteemed correspondent in Brussels has forwarded to us a few particulars in regard to the consumption of gas in that city, which are specially interesting, inasmuch as they support, far better than any arguments could possibly do, the contention so frequently urged in the JOURNAL, that increased consumption invariably follows a reduction in the price of gas. The gas supply of Brussels, as our readers are aware, is in the hands of the Municipality, who have of late years had to contend with a very serious competitor in oil, the employment of which for shop and domestic lighting has been greatly facilitated by the cheap lamps which are now produced in such large numbers. Two years ago, the Municipality took the bold step of lowering the price of gas to 15c. per cubic metre, or 3s. 4½d. per 1000 cubic feet; the price of "day" gas (that used for cooking purposes or for motive power) being 10c. per cubic metre. The following figures show the result:—

| | 1886. Cub. Met. | 1887. Cub. Met. | 1888. Cub. Met. |
|---|---|---|---|
| Gas sent from the works . | 18,659,909 .. | 20,492,051 .. | 24,019,086 |
| Gas consumed on the works | 444,481 .. | 481,469 .. | 577,074 |
| Total consumption . . . | 19,104,390 .. | 20,973,520 .. | 24,596,160 |
| Equal in cubic feet . . . | 674,000,000 .. | 740,000,000 .. | 868,000,000 |

It will be seen from the above figures that in 1887 there was an increase of 1,832,142 cubic metres, or 9·82 per cent., in the quantity of gas delivered to the consumers, as compared with the preceding year; and in 1888 an increase of 3,527,035 cubic metres, or 17·21 per cent., as compared with 1887. So that the gas sent out for consumption went up in two years from 18,659,909 to 24,019,086 cubic metres—an increase of 5,359,177 cubic metres, or 27·03 per cent. These figures, of course, include the gas consumed for the public lighting; but this varies little year by year. Leaving this out of consideration, the statistics sent by our correspondent show the important fact that, in the space of two years, the private consumption of gas has increased by at least 25 per cent., in spite of the competition of oil. Such a result may be left to speak for itself—it needs no comment. It must not be supposed that the augmented consumption took place in the early months of the past year. Quite the contrary was the fact. In January there was an increase of 258,595 cubic metres, or 10·33 per cent., as compared with the corresponding month of the previous year; in February an increase of 243,810 cubic metres, or 11·62 per cent. In October, however, there was a rise of 397,406 cubic metres, or 19·12 per cent.; and in the following month one of 341,744 cubic metres, or 13·17 per cent.—the last month in the year showing a still more favourable record. The Gas Committee will soon present their annual report, the principal portions of which will, as usual, be reproduced in the JOURNAL. Its publication will doubtless bring out some additional interesting particulars as to the gas supply of the Belgian capital, to which it may be useful to direct attention.

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## THE RELATION OF WATER SUPPLY AND DISEASE.

IN pursuance of the intimation given in the article on this subject which was published in the JOURNAL a fortnight ago, it is now proposed to point out some of the changes which were brought about in the system of Metropolitan Water Supply between the years 1832 and 1866. This can be very briefly done; and the record will pave the way for some further consideration of the all-important question of the pollution of the Thames. In 1832 this river and the Lea contributed, as they still do, a very large proportion of the total water supply of London. The remainder was drawn from shallow wells. But Londoners of those days possessed this advantage—the river-side population was far smaller than it is at present; and the cesspool system, then in force, though objectionable from an individual point of view, caused less risk to a man's neighbours than that which arose at a subsequent period of Metropolitan history. In the course of the seventeen or eighteen years which preceded the cholera outbreak of 1849, not only the condition of water supply, but the methods of drainage underwent very considerable developments. During the same period there was, of course, an enormous increase in the population. The sewerage system gradually spread all over London; and the use of water-closets was more or less generally adopted. These, however, proved to be half-measures, fraught with infinitely greater peril to the inhabitants than had been incurred under the ancient methods of disposing of sewage. Indeed, it was said, and well and truly said, that forty years ago there existed the most perfect organization for the diffusion of the excremental discharges of the Metropolis throughout the main sources of water supply, and their speedy re-conveyance to the inhabitants for daily consumption. In other words, the excrements of the people were rapidly conveyed to the Thames, the Lea, and the Ravensbourne; while at one and the same time these rivers were drawn upon in order to furnish London with its daily supply of drinking water. The fearful epidemic of cholera, in which the loss was nearly 62 per 10,000 of the population, was but the logical outcome of the state of things we have described.

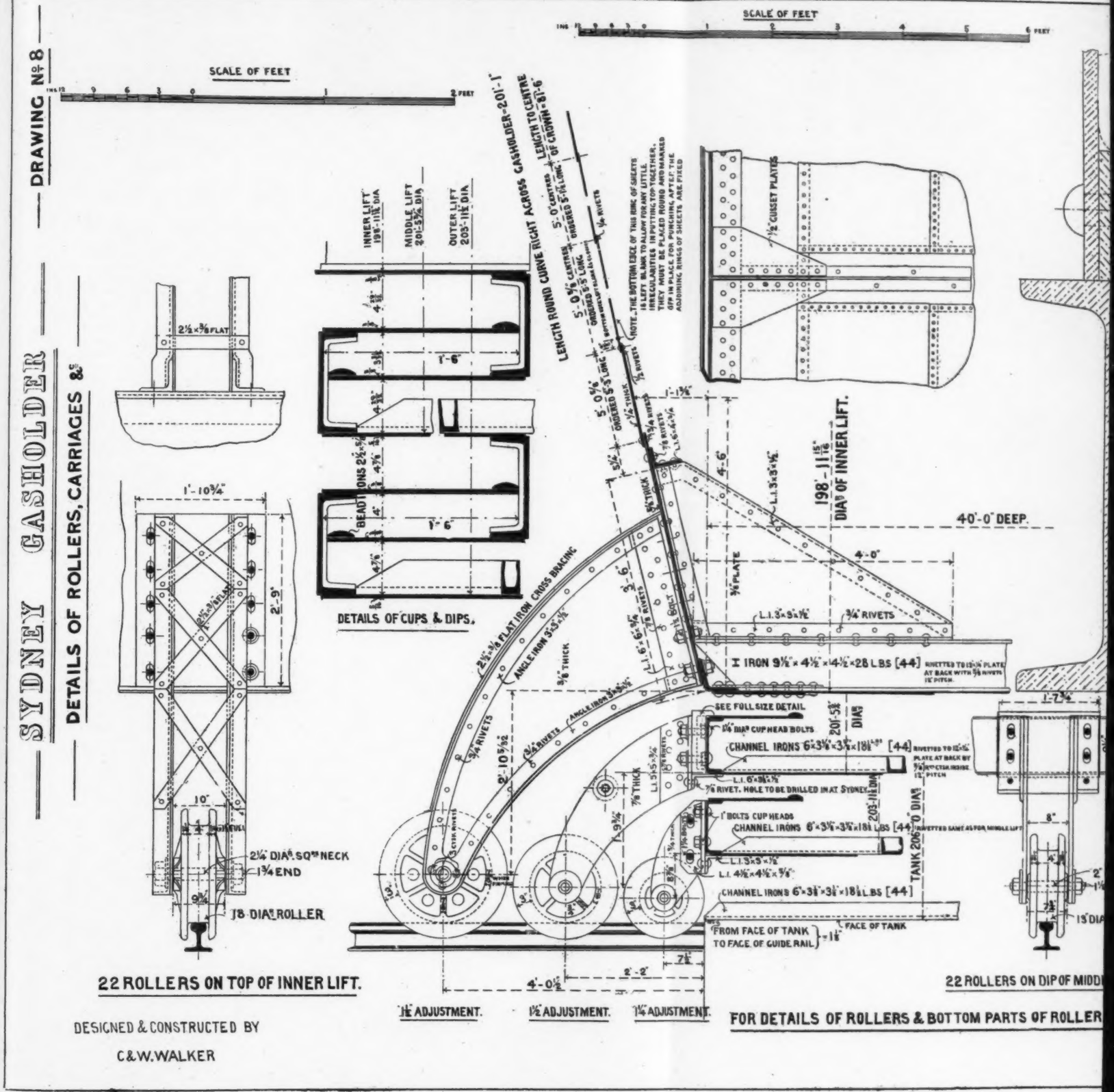
During the five years which intervened between the last-mentioned outbreak, and the epidemic of 1854, some improvements were effected. Instead of the intake being confined to the Metropolitan limits of the Thames, some, though not a very considerable portion, of the water supply was now drawn from the river above Teddington Lock. The effects of this partial advance soon made themselves felt; for in 1854 the victims of cholera were only 46 instead of 62 per 10,000 inhabitants. Between 1854 and and 1866 far greater things were accomplished by the Water Companies. In course of time the tidal portion of the Thames had been discarded

— DRAWING № 8 — SYDNEY GASHOLDER

# SYDNEY GASHOLDER

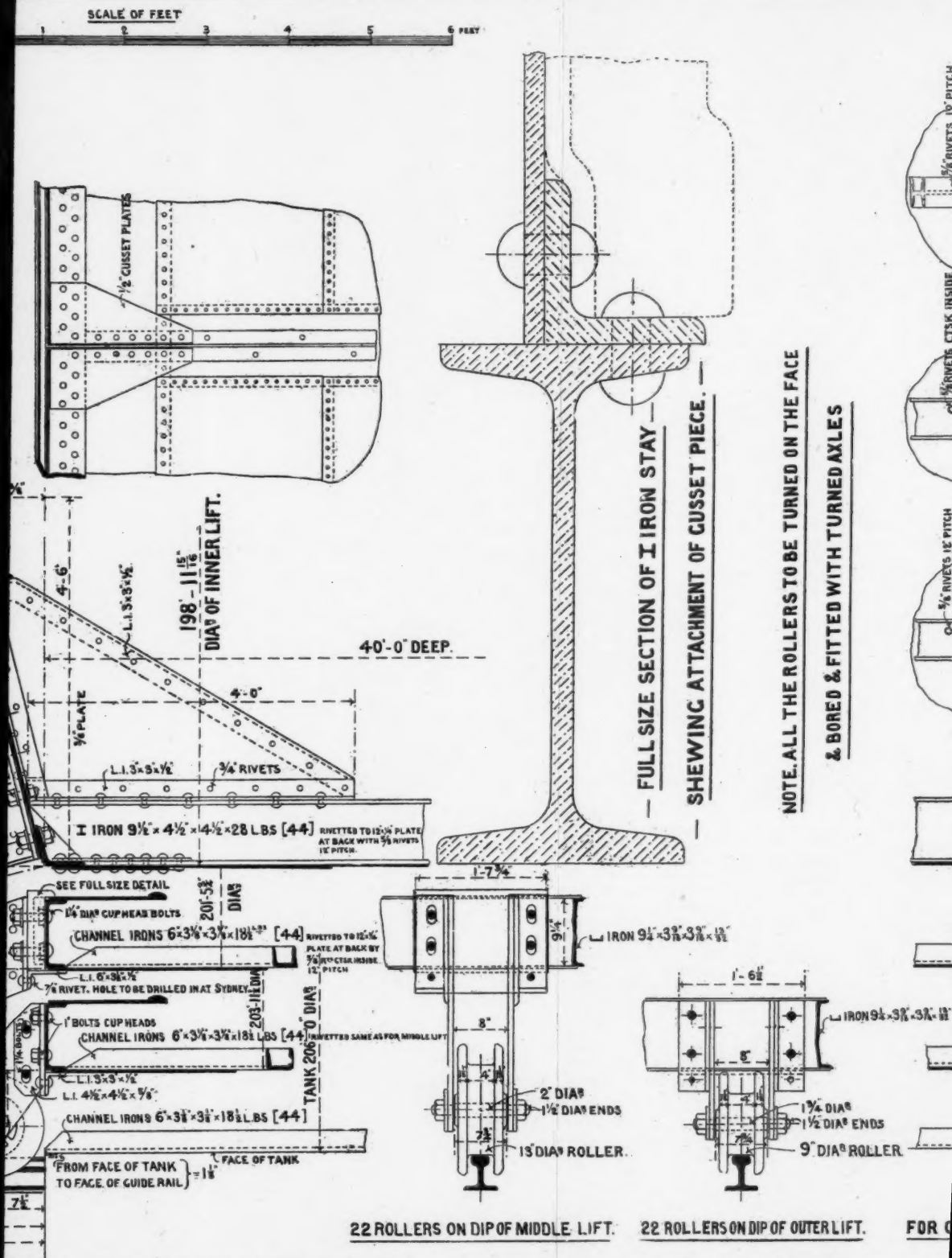
## DRAWING Nº 8

## DETAILS OF ROLLERS, CARRIAGES &c

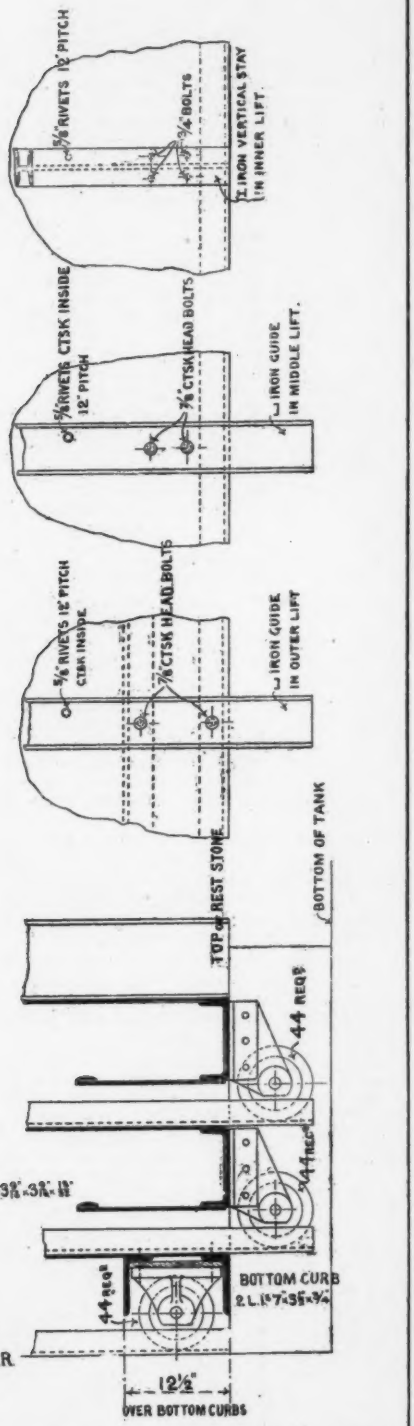

SCALE OF FEET
SCALE OF FEET
LENGTH ROUND CURVE RIGHT ACROSS GASHOLDER = 201'-1"
LENGTH TO CENTRE OF CROWN = 81'-6"
5'-0" CENTRES GIRDERED 5'-5" LONG
5'-0⅛" CENTRES GIRDERED 5'-5⅛" LONG
INNER LIFT 198'-11½" DIA
MIDDLE LIFT 201'-3⅞" DIA
OUTER LIFT 203'-11½" DIA
½" GUSSET PLATES
NOTE.-THE BOTTOM EDGE OF THIS RING OF SHEETS IS LEFT BLANK TO ALLOW FOR ANY LITTLE IRREGULARITIES IN PUTTING TOP TOGETHER. THEY MUST BE PLACED ROUND AND MARKED OFF IN PLACE, FOR PUNCHING, AFTER THE ADJOINING RINGS OF SHEETS ARE FIXED
2½"×⅜" FLAT
1'-6"
BEADED IRONS 2½"×½"
DETAILS OF CUPS & DIPS.
1'-10¾"
2'-9"
2¼" DIA.ª SQ.ª NECK
1¾" END
9¾"
7/8 DIA.ª ROLLER
22 ROLLERS ON TOP OF INNER LIFT.
198'-11 15/16" DIA.ª OF INNER LIFT.
40'-0" DEEP.
4'-6"
4'-0"
¾" PLATE
L.I. 3"×3"×½"
¾" RIVETS
I IRON 9½"×4½"×14½"×28 LBS [44] RIVETTED TO ⅜" PLATE AT BACK WITH ⅝" RIVETS 12" PITCH
SEE FULL SIZE DETAIL
1⅛" DIA.ª CUP HEAD BOLTS
CHANNEL IRONS 6"×3½"×3½"×18½ LBS [44] RIVETTED TO ⅜" PLATE AT BACK BY ⅝" C'SUK RIVETS INSIDE 12" PITCH
L.I. 6"×3½"×½"
⅞" RIVET HOLE TO BE DRILLED IN AT SYDNEY
201'-5⅜" DIA.ª
1" BOLTS CUP HEADS
CHANNEL IRONS 6"×3½"×3½"×18½ LBS [44] RIVETTED SAME AS FOR MIDDLE LIFT
L.I. 3"×3"×½"
L.I. 4½"×4½"×⅝"
CHANNEL IRONS 6"×3½"×3½"×18½ LBS [44]
TANK 206'-0" DIA.ª
FROM FACE OF TANK TO FACE OF GUIDE RAIL = 1'-1½"
FACE OF TANK
2½"×⅜" FLAT IRON CROSS BRACING
ANGLE IRON 3"×3"×½"
⅜" THICK
⅞" RIVETS
2'-10⅝"
¾" RIVETS
ANGLE IRON 3"×3"×½"
L.I. 6"×6"×¾"
⅞" RIVETS
3'-6"
⅞" BOLT
L.I. 5"×5"×¾"
⅞" C'SUK RIVETS
1'-9¾"
4'-0"
2'-2"
7½"
1½" ADJUSTMENT.
1½" ADJUSTMENT.
1¼" ADJUSTMENT.
1'-7½"
8"
2"
1½"
2½"
15" DIA.
22 ROLLERS ON DIP OF MIDDL
FOR DETAILS OF ROLLERS & BOTTOM PARTS OF ROLLER

DESIGNED & CONSTRUCTED BY

C&W. WALKER


SCALE OF FEET
1 2 3 4 5 6 FEET
½" GUSSET PLATES
198'-11 15/16" DIA.S OF INNER LIFT.
40'-0" DEEP.
4'-6"
4'-0"
L.I. 3"×3"×½"
⅜" PLATE
¾" RIVETS
I IRON 9½"×4½"×4½"×28 LBS [44] RIVETTED TO 12"×⅜" PLATE AT BACK WITH ⅝" RIVETS 12" PITCH.
SEE FULL SIZE DETAIL
1¼" DIA.S CUP HEAD BOLTS
CHANNEL IRONS 6"×3½"×3½"×18½ LBS [44] RIVETTED TO 12"×⅜" PLATE AT BACK BY ⅝" DIA.S CTSK INSIDE 12" PITCH
L.I. 6"×3½"×½"
⅞" RIVET. HOLE TO BE DRILLED IN AT SYDNEY.
1" BOLTS CUP HEADS
CHANNEL IRONS 6"×3½"×3½"×18½ LBS [44] RIVETTED SAME AS FOR MIDDLE LIFT
L.I. 3"×3"×½"
L.I. 4½"×4½"×⅝"
CHANNEL IRONS 6"×3½"×3½"×18½ LBS [44]
20'-5½" DIA.S
20'-11" DIA.S
20'-0" DIA.S
TANK
FROM FACE OF TANK TO FACE OF GUIDE RAIL = 1'-1½"
FACE OF TANK
7½"
— FULL SIZE SECTION OF I IRON STAY —
— SHEWING ATTACHMENT OF GUSSET PIECE. —
NOTE. ALL THE ROLLERS TO BE TURNED ON THE FACE & BORED & FITTED WITH TURNED AXLES
1'-7¾"
IRON 9¼"×3½"×3½"×½"
8"
2" DIA.S
1½" DIA.S ENDS
15" DIA.S ROLLER.
1'-6½"
IRON 9¼"×3½"×3½"×½"
8"
1¾" DIA.S
1½" DIA.S ENDS
9" DIA.S ROLLER
22 ROLLERS ON DIP OF MIDDLE LIFT.
22 ROLLERS ON DIP OF OUTER LIFT.
FOR DETAILS OF ROLLERS & BOTTOM PARTS OF ROLLER CARRIAGES SEE FULL SIZE DRAWINGS.

KING, SELL & RAILTON Ltd., Printers, 12




FOR CUP ROLLERS & BOTTOM ROLLERS

SEE FULL SIZE DRAWING.

Ltd., Printers, 12, Gough Square, Fleet Street, London, E.C.

as a source of supply in favour of the water available above Teddington Lock. The Kent Water Company abandoned the Ravensbourne as a direct source of supply; and the East London Company removed its chief intake from Old Ford—where the River Lea was much polluted—to Lea Bridge. Speaking of the water supply generally, an advance had been made which enabled the inhabitants of London to contend under hopeful conditions against the renewal of the cholera scourge, which once again made its appearance in their midst. The statistics which have been most carefully preserved by the Society of Arts speak for themselves. The mortality during this visitation was only 18 per 10,000 of the population. But in order to appreciate the full significance of these figures, as compared with those already cited, it is necessary to notice that the cholera outbreak of 1866 was in its most virulent development confined to those parts of London which comprised a district supplied by one Company. In the opinion of Mr. John Simon this was attributable to the partial use by the East London Company of water drawn from a portion of the River Lea, which was especially exposed to contamination through the agency of sewage. "Speaking broadly," said Mr. Simon in his evidence given before the Royal Commission on Water Supply, "the area of intense cholera in 1866 was almost exactly the area of this particular water supply, nearly, if not absolutely filling it, and scarcely, if at all reaching beyond it." Subsequent investigations brought to light the indisputable fact that, whether inadvertently or not, on at least two or three occasions in the year referred to, foul and unfiltered water from the Company's uncovered reservoirs at Old Ford was resorted to for the purpose of making good a temporary deficiency of filtered water. The contamination of this storeage was explainable by the spontaneous percolation of foul water from surrounding porous sewers and sodden gravel, as well as from the river itself. The Lea and its canal were at that period little better than open cesspools, receiving the sewage of the populous district of Old Ford, Bow, a portion of Bromley, and of certain parts of Mile End. Exhaustive evidence was laid before the Rivers Pollution Commission of 1866, and this amply supplied the links which until then had been missing from the chain of proof. In the result, the Commissioners arrived at a sequence of conclusions which no one now-a-days would attempt to gainsay—viz., the contamination of the river by choleraic discharges, the access of the infected sewage to the reservoirs at Old Ford, the distribution of the polluted water immediately before the general outbreak of cholera in the East-End, and the virtual localization of the disease within the limits already mentioned.

It was upon the facts that were thus so clearly demonstrated that Mr. Simon based his *dictum*, that it ought to be made an absolute condition for a public water supply that it should be uncontaminable by drainage. If full effect has not, even yet, been given to the common-sense view thus expressed, a fair examination of the facts must justify anyone in saying that the blame is not attributable to the London Water Companies. Whatever may have been the shortcomings of the East London or of any other Company in the past, it is undeniable that since 1866 the Directors of these undertakings have loyally striven to do their duty to the Metropolitan public. This we assert without fear of contradiction from any impartial person; and, in due course, we shall support our statement by referring more specifically to what has been accomplished in the various Metropolitan districts.

## WATER BILLS FOR 1889.

The following are Companies' Bills relating to water supply deposited for the coming session. The Barrow Hæmatite Steel Company, Limited (Water Supply) Bill is for authorizing the Company to obtain a supply of water from the River Duddon. The preamble recites the objects for which the Company was founded, and states that they have spent upwards of £2,000,000 upon their works and undertaking, in which several thousand men are employed. The Company require upwards of 4 million gallons of water daily in their works, and have hitherto been supplied by the Corporation of Barrow-in-Furness. They now complain that the supply is inadequate for their purposes and allege that the Corporation cannot afford them an increase, wherefore they desire to make their own arrangements for a supply. These are to consist of damming the Duddon River and another stream, and conveying the water in pipes to their reservoirs in Barrow. The land is to be acquired within one year, and the works completed in 18 months, after the passing of the Act. Power is desired for disposing of the undertaking to the Corporation; and for the borrowing by the latter of the necessary money for this purpose. The East Kent District Water Bill is to incorporate a Company for the supply of water in a district comprising Sandwich, Eastry, St. Margaret's-at-Cliffe, and other places bordering upon the municipal boundary of Dover. The capital of the Company is to be £40,000, with power to borrow £10,000. The works, to be completed within five years, consist of a well and pumping station in East Langdon parish. The rates for domestic supplies range from 7 to 5 per cent. on the rental. The Garw Water Bill is to incorporate a Company formed for the purpose of acquiring the water undertaking of the Garw Water and Light Company, Limited, Glamorganshire. The capital of the Company is to be £50,000 with power to borrow £12,500. The undertaking of the limited Company is to be transferred to the new Company, within nine months after the passing of the Act, for the sum of £5000. Additional works, chiefly consisting of the damming of streams, are to be constructed within 15 years, upon land compulsorily acquired within 7 years. Rates for domestic supply are to range from 7½ to 6 per cent. The Company desire power also to purchase the Porteawl Water-Works upon such terms as may be agreed. The Kettering Water Bill is to incorporate a limited Company that had previously obtained a Provisional Order in 1872, another in 1886, and a third in 1888. The capital of the Company is to be £70,000, whereof £10,000 was authorized in 1872, a second £10,000 in 1886; and £50,000 is to be the additional capital to be authorized by the present Bill. The sum of £5000 is to be borrowed in respect of the £20,000 of old capital, and £12,500 on the additional capital. New works are to be constructed, comprising an impounding reservoir on the Cransley Brook and a pumping station in the parish of Cransley, to be completed within 10 years. Rates for domestic supply are to range from 10 to 9 per cent.; while water for flushing sewers is to be supplied to the local authorities at the price of 2s. 6d. per 1000 gallons. The Long Eaton and District Water Bill is to incorporate a Company with a capital of £30,000, and power to borrow £7500. The works are to comprise a well and pumping station in Sawley parish and another in Stapleford parish, all to be completed within 7 years. Rates for domestic supplies range from 12 to 6 per cent. The Rastrick Water Bill is for the incorporation of a Company formed in 1870 within the district of the Corporation of Halifax, purchasing water in bulk from the Corporation, and distributing it in addition to water obtained by themselves from springs. The Bill states the original capital of the Company at £6000, which is vested in the registered members of the limited Company. Power is desired for raising £9000 of additional capital with liberty to borrow £2000 in respect of the original, and £2250 upon the additional capital. The authorized works comprise a reservoir in the township of Fixby, and certain lines of main. The powers of supply of the Halifax Corporation in the district are to be repealed. Rates for domestic supplies are to range from 10 to 8 per cent., with the higher rate for all inns. The Corporation of Halifax have agreed to supply the Company with water in bulk for 5d. per 1000 gallons. The South Kent Water Bill contemplates the incorporation of a Company for the supply of water in the neighbourhood of Marden, Tenterden, &c., in Kent, with a capital of £60,000, and power to borrow £15,000 more. The works are to include a well and pumping station in the parish of East Peckham, to be completed within five years. Rates for domestic supply range from 7½ to 5 per cent. The Woodhall Spa Company's Bill is to authorize the construction of water-works for the supply of a health resort in the Parts of Lindsey, Lincolnshire, with a special capital of £10,000 and power to borrow £2500. The land is to be acquired within 4 years; and the works completed within 7 years. These comprise a pumping station, &c., in the parish of Tattershall Thorpe. Rates for private supplies range from 8½ to 6 per cent.

The Barry and Cadoxton Gas and Water Bill is to enable the Company to raise £12,800 of additional capital for the purposes of their water undertaking, with power to borrow £3200 in respect of the same. New works, consisting of two wells in the parish of St. Andrew's Major, and a service reservoir and the necesary connecting mains, are to be constructed within 7 years. The Bristol Water Bill is to enable the Company to raise £100,000 of new capital, to borrow £25,000, to abandon certain portions of the works authorized by their Act of 1888, and to construct a reservoir and pumping station and make other subsidiary works. It is provided that compensation water to the amount of 1,900,000 gallons daily shall be discharged into the River Yeo, which is to be impounded. Additional lands are to be acquired and the works are to be completed within 10 years. The Cleveland Water Bill recites that by reason of the depreciation of the value of property within the Company's limits of supply, the charges which they were authorized by former Acts to make for water supplied for domestic purposes, and which are payable according to the annual value of the tenements supplied, are unremunerative. The new rates are to range from 12½ to 7½ per cent. The word dwelling-house is defined to mean "a house, tenement, or premises in the occupation for domestic purposes of one family and shall not include hotels and institutions of a public character;" the latter places being entitled to demand to be supplied by meter. The Coventry Corporation Water Bill is to enable the Corporation to enlarge their water-works by sinking a well with drifts and pumping station in the parish of St. Michael, and another in Holy Trinity Parish, both in Coventry, together with the necessary service reservoirs and pipe lines, all to be completed within 10 years. The minimum charge for water under a former Act is to be raised from 4s. to 8s.; and water rates are to be made payable half-yearly in advance. The Corporation desire to borrow £100,000 for the purposes of their water undertaking. The Eastbourne Water Bill is to enable the Eastbourne Water-Works Company to raise £100,000 of additional capital, and to borrow £25,000 in respect of same. Their works are to be extended by the construction of two new reservoirs, and the deepening of two others, all to be completed within 10 years. The Newcastle and Gateshead Water Bill is to empower the Company to raise £500,000 of additional capital, and to borrow £125,000 in respect thereof. New works, comprising an impounding reservoir on the river Rede and the necessary pipe lines, are to be completed within 10 years. The Plymouth Dock (Devonport) Water Bill is to change the name of the Company to that of the Devonport Water Company. Additional capital to the amount of £80,000 is desired, with power to borrow £20,000. The works are to be enlarged by the construction of an addition to the existing Crown Hill Reservoir in the parish of Tamerton Foliott, to be completed within 10 years

The Company's limits of supply are to be extended over several adjacent parishes. The Rickmansworth and Uxbridge Valley Water Bill is to enable the Company to raise £176,000 of new capital, with power to borrow £44,000. The limits of supply are to be extended to the parishes of Harmondsworth, Sunbury, Shepperton, and Littleton, in Middlesex. The contemplated new works comprise two lines of main, to be completed within 5 years. The Windermere District Gas and Water Bill is to enable the Company to raise £15,000 of additional water capital, with power to borrow one-fourth of the amount paid up. The new works contemplated include an enlargement of the existing Dubbs Beck Reservoir, and the construction of another impounding reservoir across the River Gowan, to be completed within 5 years. Provisions with relation to compensation water are set out at length. The Yeadon Water Bill is to extend the Company's limits of supply and to enable the raising of additional capital to the amount of £28,000, with power to borrow £7000. Additional works, consisting of a storeage reservoir and lines of piping, are to be constructed within 7 years. The rates to be charged in future for water supplied for domestic purposes are to range from 10 to 7½ per cent. Compensation water is to be provided in the case of the streams to be impounded.

We defer till next week, the notices of the Corporation Bills.

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Presentation to Mr. J. F. Bromley.—A few days ago the *employés* of the Bolton Corporation Gas Committee made a presentation to Mr. J. F. Bromley, the late Assistant Manager of the works, and now Gas Manager to the Batley Corporation. The ceremony took place at the Lum Street works, and Mr. William Smith, the Manager, was spokesman for the officials and workmen. The articles presented were a gold centre-second chronograph watch, together with a gold albert chain and seal, a splendid case of mathematical instruments and drawing board, with "T" and set squares; and they had been spontaneously contributed to by officials and men alike. Mr. Smith referred to the lengthened and faithful service his late coadjutor had rendered to the Corporation, and expressed the best wishes of himself and the men for his future welfare. Mr. Bromley warmly thanked the donors for the tangible evidence of their goodwill towards him that day, and also by the "fitters" section recently when, acting on their own behalf, they likewise offered him a very handsome token of their regard.

The Use of Gas-Engines in Manchester.—In the course of a communicated article in the *Manchester Guardian* of Wednesday last, bearing the title of "The Sanitary Requirements of Manchester," the writer, referring to smoke-preventing appliances, advocated the substitution of the gas for the steam engine where small power is required. He said: "This process is rapidly going on. There are already 500 gas-engines at work in Manchester; and it may be safely assumed that before steam was superseded in these cases, there had been satisfactory evidence of economy in the change. Would it not be good policy for the Corporation to stimulate this transition by materially reducing the price of gas? The charge for city improvements no longer depends on gas profits. Why make them? The Gas Committee has on its hands a comparatively unused gas-works at Bradford Road, capable of supplying gas in sufficient volume to replace all the small-power engines in the city. Why not lower the price to a point which will simply pay cost, fixed charges, and sinking fund, and at once develop a valuable but at present unutilized property, and at the same time contribute in a very large degree to the suppression of the great smoke evil? This suggestion is submitted very respectfully to the Gas Committee. Among its members are those who are as anxious as any for the sanitary well-being of the city. If Leeds can supply gas at 1s. 8d., Plymouth at 1s. 9d., and Sheffield at 1s. 10d., surely Manchester might supply it at 2s. instead of 2s. 8d. And it cannot be doubted that if 500 gas-engines have been adopted at the present high price, such a reduction would greatly stimulate their further use." Referring to this communication, a correspondent, signing himself "W.S.H.," informs our contemporary that Messrs. Crossley Bros. have more than 600 of their engines at work in Manchester, ranging from 2-man up to about 40-horse indicated; and allowing for the small engines of other makers, there cannot be less than 700 gas-engines at work in Manchester and Salford. The proportion in the latter town, however, is very small indeed. These engines, he estimates, bring to the Gas Committee about £400 weekly for gas consumption; the gas being charged to the users at its present high rate. If it were reduced to 2s., or below that, when he holds it would pay well, the number of gas-engines would be increased, and they would be used in much larger sizes, taking the places of steam-engines at present at work, and a great decrease would then be made in the smoke nuisance. Gas-engines, the writer continues, are now being built and used up to 100-horse power; and the only limit to their being used in these larger sizes is the high rate of gas. This is forcing users to put down their own separate gas-making plants, with which they can manufacture gas at about 8d. per 1000 cubic feet; and with such plants they are using gas-engines of a total indicated power of 200 and 300 horse power. Some firms will very shortly be using over 400-horse power "Otto" gas-engines. In conclusion he says that Messrs. Crossley Bros.' own works at Openshaw have, for the last six years, been driven entirely by gas-engines equal to about 300-horse power, supplied from their own gas-making plant.

# Notes.

### Rope Gearing.

The question of rope driving in substitution for belts in engine-rooms and machine shops is attracting much attention from engineers. As the case is stated by an American contemporary, three types of grooved pulleys are used for rope gearing. One is the U-shaped groove for binder pulleys only, where the rope rests in the bottom of a semi-circle large enough to hold it. Another variety of groove is V-shaped. The third is nearly elliptical; the radius of the bottom groove being about 60 per cent. of the radius of the rope. The speed of such gearing is limited to about 5000 feet per minute, at which velocity the element of centrifugal force becomes important. The working strain on the ropes varies widely in practice. As much as 500 to 600 lbs. have been put upon a 2-inch diameter rope, although the best practice would restrict the strain upon such a rope to one-half of that amount. In good practice the stress upon the ropes should run from about 250 lbs. upon a rope 1¼-in. diameter, to 350 lbs. for ropes up to 2¼-in. diameter. The advantages claimed for rope-gearing as compared with belts are: The absence of slip; ability to turn corners and run to any required distance; and cheapness in the first place, and also in maintenance. On the other hand, it is claimed that the mechanical efficiency of rope driving is not so high as by belts; that the proportion of power absorbed in pressing the ropes into their grooves and then pulling them out again is a considerable element in the problem; and that the wear of ropes is generally above the estimate. Manila ropes require to be specially laid and treated for the purpose, or they will not give such a high duty as cotton ropes.

### Testing Gas for Benzene Vapour.

In a communication recently made to the *Bulletin de la Société Chimique*. M. Berthelot furnished some additional facts in regard to his experiments in the estimation of the quantity of benzene vapour contained in coal gas. In 1876 he found that the light-giving property of Paris gas was due in a great measure to the presence of benzene vapour, in opposition to the opinion generally accepted up to that time, that in the composition of this gas there was a considerable proportion of ethylene. As far back as 1854 he demonstrated that this proportion was greatly exaggerated. The quantity of benzene vapour in gas varies according to the conditions under which the coal is carbonized. He estimated it by weighing crude nitro-benzene, obtained by passing ordinary illuminating gas into fuming nitric acid. These results at first caused surprise to those chemists who were accustomed to calculate the composition of lighting gas according to a hypothetical system of eudiometric equations, into which benzene vapour never entered. The presence of considerable quantities of benzene having been established by the direct experiment of condensation at a very low temperature, M. Berthelot's opinion as to the illuminating property of benzene vapour remains unchanged. In a communication to the *Annales de Chimie et de Physique*, this able chemist has described a process for the approximate estimation of benzene vapour, based upon the action of a small quantity of fuming nitric acid (1 cubic centimetre) upon gas measured upon water in a small flask of 20 or 25 c.c. capacity, agitated for a few seconds; the acid becoming necessarily diluted to a certain extent by the water remaining upon the sides of the flask. The conditions set out in the author's communication to the *Annales de Chimie* are indispensable; mono-hydrated nitric acid being a very powerful oxidant, which would generally oxidize all the oxidizable gases (acetylene, ethylenic, and other hydrocarbons, carbonic oxide, &c.), if time were allowed it to re-act to great excess—for 7, 10, or 20 minutes, for example, instead of for the few seconds indicated.

### Water Waste Prevention.

In December, 1887, Messrs. E. Atkinson and A. D. Chandler, together with the Water Board of Brookline, Mass., were appointed a Committee to see what measures should be adopted by the town to prevent waste and leakage in the use of water, which in 1886 amounted to 55 per cent. of the total consumption, and was increasing. The Committee reported that they knew no other way to check the waste but by the use of meters; and to sound public sentiment on the question, a well-attended public meeting was held last September, in which, after full discussion, the only objection came from some owners of tenement houses, and from others who feared that a restricted use of water might tend to promote typhoid and similar diseases. The first objection was answered by stating that it was not intended to make the use of meters compulsory, but advantageous. The second was settled by a quotation from the *Engineering and Building Record* of April 23, 1885, to the effect that a continual dribble, while it wastes water, does not clean drains; and other more extended quotations from the same source were given in the appendix to the Committee's report. It was shown that, while the average consumption in the town is 80 gallons daily per head of the population, forty householders using meters found 31 gallons daily per head an ample supply, and saved by meter rates from 42 cents to $27·46 over fixture rates apiece per annum—the average appearing to be considerably over $10. One metered tenement house holding eighteen persons had but 11 gallons of water daily per head, though its use was unrestricted. The Committee recommend the town to put in meters free of cost where asked for at an annual rental of $2 (which will reimburse the town during the life of the meter), and charge for water the actual

cost of supplying it, which is 2 cents per 100 gallons. The town had previously supplied meters only to those willing to pay for them, together with the cost of putting in and maintenance, and had fixed a minimum charge for metered water of $10 per annum, which it is now proposed to abolish.

COKE BREEZE AND CEMENT CONCRETE.

Mr. W. Simmons, F.R.I.B.A., has sent to the *Builder* an account of some concrete work, which has been done recently on London, under his supervision. He states that he has made concrete floors in two ways, in three buildings of very different class, and the results have been satisfactory. Except for a Doulton-stone front, and some parts of the party-walls, which are of brick, one large eight-story building in Lincoln's-Inn-Fields is wholly of concrete, walls, partitions, foundations, floors, and roof. The foundation of the main block is a single slab of cement concrete 3 feet thick; and on this, without other footings, the walls were formed of river ballast, coke breeze, and cement. As the walls rose, the floors were put in; being formed of concrete on a skeleton framing of 4 inch by ¼ inch wrought-iron bars, placed on edge, 2 feet apart, with 6-inch bearings on the walls. Through holes in the flat bars were threaded ½ in. round bars at 2-feet intervals; so that the floor was divided into 2-feet squares. Finally, between each pair of 4-inch bars, and lying on the ½-inch bars, was a ½-inch square rod, each end running a few inches into the wall. This skeleton network of iron rods was formed on a platform of rough boards, and blocked up ¾ inch above it. The concrete was formed of coke breeze and Portland cement, mixed in the usual way, and well rammed down between and over the bars and their bearings to a total thickness of 7 inches. On these cores a surface, which in most rooms consisted of granite grit and cement, laid 1 inch thick, was laid at the time the walls were rendered. The ceilings and walls were plastered with Martin's cement, and distempered with Orr's washable "Duresco." The roof surfaces were covered with asphalte. The outside walls were rendered with Portland cement, and distempered with "Duresco." There are no cracks in this building.

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DEATH OF SIR HENRY HUNT.—Last Sunday week, Sir Henry Arthur Hunt, K.C.B., who for many years has had a very extensive practice in various arbitrations relating to gas and water works transfers, &c. (principally in the capacity of Umpire), died at his residence at Folkestone. He was the son of Mr. James Hunt, of Westminster, and was born in 1810. He was a partner in the firm of Hunt, Stephenson, and Jones, Surveyors, and had been Consulting Surveyor to Her Majesty's Office of Works, and Auditor for the Dean and Chapter of Westminster. He was made a C.B. in 1871, and received his knighthood in 1876.

WATERTIGHT CONCRETE.—This was the subject dealt with in a paper read last Wednesday at a meeting of the Association of Manchester Students of the Institution of Civil Engineers. The author, Mr. G. T. Lynam, divided the paper into five sections—(1) Portland cement, (2) aggregates, (3) mixing, (4) laying and building, (5) contraction and cracks. The first, second, and third applied to concrete generally, the fourth and fifth to watertight concrete. Attention was drawn to the mixing of concrete, also to the constituents of Portland cement, storeage and testing, method of gauging for tests and testing machines, and the manner of laying concrete floors. The paper then dealt with the method of building thin walls and face work, the cause and danger of cracks, method of controlling and making good the same; and, in conclusion, the author urged the necessity of the utmost care in the manipulation of concrete in all its stages, and of strict supervision.

RECOVERY OF SULPHUR FROM ALKALI WASTE.—It is reported that a commencement has been made at the Friar's Goose works of the Jarrow Chemical Company, Limited, with the process for the recovery of sulphur from tank waste, by means of limekiln gases, under Chance's patent. It will be in the recollection of our readers (in fact it was again mentioned in the JOURNAL a fortnight since) that last March a paper was read by Mr. A. M. Chance, of Birmingham, before the London Section of the Society of Chemical Industry, in which the author described at some length a process he had patented for the recovery of sulphur from tank waste; the process having given very satisfactory results at the works of Messrs. Chance Bros. at Oldbury. Briefly the process consists in the elimination of sulphuretted hydrogen from the waste by means of carbonic acid, obtained in the ordinary way by burning limestone. When the sulphuretted hydrogen is of sufficient purity, it is conducted to a large gasholder, and thence to a patent kiln, where it is burnt—the sulphur afterwards subliming in a cooling chamber; or, if it be so desired, the sulphuretted hydrogen can be used for the manufacture of oil of vitriol by burning it in the ordinary pyrites kiln. The inventor claims by his process that from 98 to 99 per cent. of the sulphur in the tank waste can be accounted for when manufactured into sulphuric acid or vitriol, or 95 per cent. in the form of sulphur. Shortly after the reading of the paper, the Jarrow Chemical Company commenced to lay down plant for the purpose of obtaining the sulphur by Mr. Chance's patent, and a commencement with the process, as intimated above, has already been made. As the Company have not yet completed the building of the Claus kiln for the production of pure sulphur, the sulphur obtained will be used for the manufacture of oil of vitriol. On the completion of the kilns, however, they will be able to turn out perfectly pure roll or flowers of sulphur from the hitherto useless tank waste.

# Communicated Article.

## THE CHEMISTRY OF ILLUMINATING GAS.

By NORTON H. HUMPHRYS, Assoc. M. Inst. C.E., F.C.S.

IV.

Mr. Lewis Thompson tried some experiments as to the weight of various materials required to give a light equal to that yielded by 1000 cubic feet of common coal gas;* and his results were as follows:—Sperm candles, 44¼ lbs.; wax candles, 48⅝ lbs.; stearic acid candles, 51¼ lbs.; best mould candles, 52$\frac{5}{16}$ lbs.; best dip candles, 54⅜ lbs.; colza oil (specific gravity, ·915), 6½ gallons; sperm oil (specific gravity, ·888), 5$\frac{7}{16}$ gallons. In these, as in all other experiments where the weights are given, a comparison as to cost is readily arrived at, by taking the price charged in any locality. For example, with gas at 3s. per 1000 cubic feet, and colza oil at 2s. per gallon, the relative cost of gas and oil would be 3s. and 13s.; with gas at 3s. per 1000 cubic feet, and dips at 4d. per lb., the relative cost of gas and candles would be 3s. and 18s.; and so on with any other agent. Dr. Frankland, in the course of a lecture delivered before the Royal Institution in 1853, stated that the comparative cost of light from different illuminating agents—the standard being a light equivalent to 20 sperm candles of six to the pound, produced for a period of ten hours—was as follows:—Wax candles, 7s. 2½d.; sperm candles, 6s. 8d.; tallow candles, 2s. 4d.; sperm oil, 1s. 10d.; Manchester gas, 3d.; London cannel gas, 2¼d.; London common gas, 4½d.†

In 1870 a paper was read before the Society of Arts by Mr. Silber on the use of oils, either mineral or vegetable, as illuminating agents, in the course of which the author claimed to have overcome the dangers attendant upon the use of mineral oils, by means of his improvements in lamps.‡ He also described in detail a scheme for supplying oil or fluid hydrocarbon to every room in a house by means of a system of distributing-pipes in connection with an overhead store cistern; so that a supply of oil could be turned on, when required, to fixed oil-lamps, in a similar manner to the supply of gas. After some interesting remarks on the theory of luminous flames, he went on to deal with the cost of the petroleum lamps, as exemplified by some experiments, undertaken at his request, by Mr. W. Valentin. The fluid used was purified American petroleum, with a specific gravity of ·795, weighing 7·95 lbs. per gallon, boiling at about 340° Fahr., and usually sold wholesale at 1s. 6d. per gallon. This material gave a light of about 16-candle power, using Argand burners, with a consumption of from 787 to 864 grains per hour; and therefore the cost calculated on the wholesale price, for one week's consumption of 42 hours, would be about 11½d. The cost of gas at 3s. 9d. per 1000 cubic feet, reckoning 3 candles per cubic foot of gas used to give a similar amount of light for an equal period, would be 9¾d. Some large size oil-burners, yielding respectively 34 and 38 candle power were tried; but proved to be much more costly in proportion to the light yielded. They consumed two and a half times, and four times, respectively, the quantity of petroleum required by the 16-candle lamps. Some tests made with colza oil showed that it was three times as costly as the petroleum. Mr. Silber considered that these experiments did not do justice to the capabilities of petroleum; and he turned his attention to the improvement of the lamps. His endeavours were attended with encouraging results; and after some alterations, which "consisted mainly of the lowering of the oil level in the wick tube," he found it possible to obtain 40 to 50 per cent. additional illuminating power, without any increase in the rate of consumption of oil. With these improvements, the petroleum would be cheaper than the gas. He tried some experiments with flat-wick lamps, and found that they cost the same, or slightly less than gas. But, although they offered several advantages in being more easily trimmed, they would not yield the intense light of the Argand burners; and therefore he gave the preference to the latter. To ensure perfect combustion in a petroleum-lamp, he said that the two principal points were that the bulk of the oil should be kept cool, and that the oil should be raised to boiling point, if not entirely vaporized, before reaching the flame. In the course of the subsequent discussion, it was pointed out that the idea of supplying oil from overhead cisterns was attended with many practical difficulties, to say nothing of the effect of such an arrangement in case of fire. One speaker complained of the unpleasant odour arising from the mineral oil-lamps, which was apparent to him as soon as he entered the room. It was stated that the idea of supplying fluid hydrocarbons from an overhead cistern to each room in the house, by means of pipes, had been tried in New Orleans. A mixture of turpentine and alcohol was used, and great difficulty was found in keeping the joints, taps, &c., tight, as ordinary gas-fittings that answered perfectly for gas would not retain the fluid.

The experiments made by Mr. Silber can readily be converted to figures appropriate to the present day, if we remember that the purified American petroleum used by him was precisely similar to the light oil or spirit usually termed benzoline, and at present retailed at about 1s. or 1s. 2d. per gallon. No heavier oil could be used satisfactorily, according to his plan, as the vaporizing of the fluid before reaching the wick would be attended with a deposition of carbon, rendering it necessary to frequently "turn up" or even to retrim the wick. The price of gas is now reduced considerably

* See JOURNAL, Vol. III., p. 475. † *Ibid*, p. 156.
‡ See JOURNAL, Vol. XX., p. 79.

below the figure named by Mr. Silber; and the consumer has it in his power, if he wishes, to obtain a duty of 6, 8, or even 10 candles per cubic foot, instead of the 3 candles, which was at that time a fair estimate.

The late Mr. F. W. Hartley conducted a number of very careful experiments with a view of arriving at the actual value of paraffin oil as an illuminant; and, stated broadly, his results show that gas at 3s. 4d. per 1000 cubic feet, reckoning only 2·4 candles duty per cubic foot, or 12 candles per 5 cubic feet, is cheaper than paraffin oil at 1s. 6d. per gallon.* New lamps, freshly trimmed, some obtained direct from the makers, with the understanding that they were to be tested, were used; and the wick was in every case carefully attended to, so as to secure complete combustion. The specific gravity of the various samples of oil used ranged from ·7888 to ·7928; so it was assumed that the specific gravity was ·8, which would give a weight of exactly 8 lbs. per gallon. It will be observed that it approximated very closely to that used by Mr. Silber. There were 23 different kinds of lamps tested, of which 13 were flat-wick, ranging from $\frac{5}{8}$ inch to $1\frac{1}{2}$ inches in breadth; 7 were duplex, the wick being nearly $1\frac{1}{4}$ inches broad; and 3 Argand, respectively $\frac{5}{8}$ inch, $\frac{15}{16}$ inch, and $\frac{17}{16}$ inch in diameter. As instancing the careful nature of these experiments, it may be mentioned that Mr. Hartley tested the flat face and also the edge of the flat-flames; the mean of the two sets of observations being taken as the illuminating value. The results afforded by the flat-wick lamps ranged from a duty of 4 candles with a consumption of 292 grains of oil per hour, to $19\frac{1}{2}$ candles with a consumption of 1183 grains; the duplex lamps ranged from 14·3 candles with a consumption of 996 grains per hour, to $19\frac{1}{2}$ candles with a consumption of 1349 grains; and the Argand lamps ranged from 8·16 to $14\frac{1}{2}$ candles, and the consumption from 459 to 755 grains of oil per hour. A table is given, showing the cost of gas at 3s. 4d. per 1000 cubic feet to produce a light equivalent to that afforded by one gallon of the oil burnt in the respective lamps, estimated according to the conditions above mentioned. It ranges from 11d. to 1s. 4d.—in most cases coming within the limits of 1s. to 1s. 2d. The consumption of oil per candle power per hour ranged from 61 to 89 grains in the flat-wick lamps; from 60 to 78 in the duplex lamps; and from 52 to 64 in the Argand lamps. This variation in the consumption of oil as compared with the value of light yielded is remarkable, considering the known ability of the operator, and the careful nature of the experiments, especially remembering that the results obtained by Dr. Stevenson Macadam exhibited a marked agreement irrespective of the nature of the lamp used. Mr. Hartley's experiments agree fairly well with those made by Mr. Valentin.

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The Sanitary Institute.—At a meeting of the Council of this Institute, held on the 9th inst. (Mr. G. J. Symons, F.R.S., in the chair), it was decided to hold two courses of twelve lectures for Sanitary Officers; the first course to commence in March, and the second in October. There were added to the register 64 members and associates, and 20 applications were read for election at the meeting next Thursday, when a lecture will be delivered by Dr. G. V. Poore, on "London, Ancient and Modern, from a Sanitary Point of View."

Gas at the Forthcoming Paris Exhibition.—Although the general lighting of the various sections of the forthcoming exhibition in Paris will be by electricity, gas will be employed to a considerable extent in the building, especially in the Machine Department, where a large supply will be required for driving the gas-engines, and for use after the extinction of the electric lights. To provide for this, about 1000 yards of 6-inch Chameroy main (composed of bitumenized sheet iron) have been laid in the Machinery Section. Where, however, the mains have to traverse galleries containing steam-pipes, those of cast-iron have been substituted, to avoid the possibility of accident through the heat affecting the composition of the Chameroy pipes. The gas will be conveyed to this portion of the building by two 6-inch mains, reaching it from different points. The exhibition authorities will pay the Paris Gas Company at the rate of 4s. 6d. per 1000 cubic feet for the gas supplied; but no charge will be made by them to exhibitors who use it for motive power. For registering the total quantity consumed, two 1500-light meters (one for each supply), capable of passing together about 30,000 cubic feet of gas per hour, will be fixed beneath the principal staircases of the building. The gas-engines will represent 300-horse power, and will require about 10,000 cubic feet of gas per hour to keep them going. The mains which have been laid in the Champ de Mars for the general supply of the exhibition extend to a total length of something like 6000 yards. They are all of the Chameroy class, and range in diameter from $3\frac{1}{2}$ to 6 inches. The gas will be supplied at a pressure of about 3 inches. As our readers are aware, arrangements have been made for a thoroughly representative exhibition of gas appliances in a building specially constructed for the purpose. The matter is in the hands of a Committee composed of officers of the Société Technique and other representative men connected with the gas industry, who have an ample guarantee fund at their disposal wherewith to make the display as complete as possible. It is to be hoped that their efforts may be fully appreciated by their colleagues, of whatever nationality, who visit the exhibition, and be productive of a feeling among them of unity and oneness of purpose in the maintenance of gas in the position in which its general utility has deservedly placed it.

*See Journal, Vol. XXXVII., p. 744.

# Technical Record.

## SIR FREDERICK BRAMWELL ON MOTIVE POWER.

As mentioned in our Edinburgh correspondent's "Notes" last week, Sir Frederick Bramwell delivered, on Tuesday, the 10th inst., the Inaugural Address in connection with the new Heriot-Watt College, at Edinburgh—a newly-organized technical institution. Lord-Provost Boyd presided; and there was a large attendance of students and friends.

Sir Frederick Bramwell said he felt it a high honour indeed to be asked to deliver an address there that evening on the occasion of the opening of the session in the new buildings of the Heriot-Watt College. But he must say it was an honour that brought with it great difficulty—the difficulty of finding a proper subject for the address. Ten years ago technical education, as a rule, was not understood. Where it was known it was not always concurred in; and one had always the very obvious and useful subject of advocating the cause of technical education. But within the last few years the matter had come under the cognisance of all; and, he believed, had met with the approval of most. Having referred at length to the two distinguished men whose names were included in the title of the College, he went on to remark upon the improvement which had been made in motors of various kinds. Since the time of Watt, there had been great improvements in the steam-engine; and at the present day they had motors worked by coal wherein steam was dispensed with, and where they were worked by the direct use of gas. They had steam-engines ranging from thousands of horse power to the fraction of 1-horse power; and gas-engines, as they knew, were coming into use, and were most convenient and economical. With the world-wide use of the heat engine in one form or another, and not withstanding the economy which had been effected in the consumption of coal in the steam-engine, he need not say that the demands upon their coal resources were daily increasing; and he presumed a steady increase both for internal use and also for exportation might be looked forward to. This being the way in which the source of motor power was locked up, it was impossible to exaggerate the importance of coal. Some four years ago he had, along with others, to investigate the behaviour of manufacturing engines of small power, ranging from 23 to 3 horse power; and they had indicated eight of these engines. The coal it was true was bad—nearly "slack;" but, nevertheless, it was awful to find that the average consumption was 18 lbs. of coal per indicated horse power, with a maximum of $36\frac{1}{2}$ lbs., when they now obtained an indicated horse power in a non-condensing engine with under 2 lbs. of good Welsh coal. He thought it was their bounden duty, by precept and by example, to do all they could to stop this state of things, to cause people to respect the coal, and to deal with it as if it were that which it was, of the most vital importance to the country and the world. As regarded the saving of coal, it was not only to be done with steam-engines, and in the substitution for steam-engines of gas-engines at no very remote date—for they had results from them that exceeded anything they knew of steam-engines—but it should be attended to in all furnace operations. In the transmission of power, too, fuel should be economised. If they could transmit power from a central source, and do it without any great loss in transmission, they attained that end. They would be able to use large, economical condensing engines, and to utilize water power. Now, as regarded these obvious advantages in laying on power, there was a variety of ways proposed, some of which had long been in use, and many were in use still. In the first place they had gas; and he had just pointed out how that was a source of motive power by the employment of the gas-engine. In America, they had the swift running ropes; they had water under pressure; and they had electricity. With respect to water under pressure, it worked the cranes at their docks, and harbours and railway stations; and so very advantageous had it been found, that for some years past it had been laid on for general purposes in Hull and London. The Company in London were lucky enough to get their Act before the craze for putting industrial undertakings into the hands of communities was fully developed; and therefore they had now obtained the benefit of that. At the present time, he presumed, an Act could not be passed without a clause in it that, if the thing answered, at the end of 20 years it should compulsorily given up for anybody who wanted to take it. This was the way in which electric lighting was entirely stopped by the Act of 1882. It was somewhat modified by recent legislation; but still it was not what it ought to be. Water under pressure was applicable in a variety of ways. He thought that 700 lbs. to the inch was a respectable pressure; and a small quantity of it represented a deal of stored-up energy. It was applied with great success in those cases where they wanted large power for a short time; and hydraulic lifts in hotels were now springing up everywhere. There was the way, also, in which the distribution of water power would, he thought, largely improve the sewerage, and therefore the health of towns, and enable works to be at all events carried out at less cost. It was very commonly the case, as they knew, with what the French called an "accidental surface," that they had patches of low-lying districts, and they had to provide for the outfalls of the sewers in those districts. Were they to put a steam-engine in each? They were commonly too local and too small to admit of the expense. It was wiser for the engineer who was laying out the sewerage to incur the expense of deep sewers, and to convey the produce of the low-lying spots to some general pumping-engine,

where it could be pumped up to the higher level; and by the application of water pressure, the difficulties were entirely solved, however small the low-lying area might be.

Adverting to the subject of electrical transmission, Sir Frederick said that probably there was no more striking instance of an apparently absolutely barren scientific discovery becoming useful in arts and manufactures and commerce than was that of electricity; and he dared say that there was no branch of physical science which in this day was more pursued, or in which more interest was taken, or about which there was more reasonable ground for hope. As long as they depended on primary batteries, no great advance was made. In telegraphy they got on, no doubt, with primary batteries; but when that hard-worked material, coal, came to be employed to generate electricity with the dynamo then began progress. When speaking of the dynamo of the present day, they ought not to forget that they owed it to Henry Wylde, of Manchester, who in the year 1865 for the first time, showed them that the permanent magnet could be dispensed with, and that a small permanent magnet might be the means of exciting a larger one, and so on to the dynamo. From that very speedily followed what was invented by several persons at the same time—the self excitation dynamos, under which almost the whole of them now were worked. At the present time they had dynamos of enormous size, requiring a large amount of horse power to work them; and, as they knew, they obtained from them so great a percentage of the whole of the energy put into them in that work that there was very little in the way of improvement to be made in that respect. He was sure he need not there labour to condemn and correct the erroneous impression as to electricity being a new power. He had tried to show that it was not a new power. Although electricity was not a prime mover, it was the most convenient form of energy. It was rapidly produced; and it was used in multifarious ways, from the daily life in their houses to their arts and manufactures. He might say that if electricity were generally used, and if it were produced by steam power, it would be a saving in fuel, because they could get more light out of the same coal when burnt to generate steam to work an engine to produce electricity to produce light, than they could get out of the gas from that coal. The Act of 1882, which prohibited in effect the distribution of electric lighting from a central source, left them in London behind their friends in the United States, where they were not so fettered. But the electric light was in itself so wholesome, so pleasant, and so desirable in all sorts of ways, that people found after all they must manufacture electricity for themselves if they could not get it otherwise. Sir Frederick proceeded to show in detail how electric phenomena might be followed by the analogy of water. No better words than "current" and "flow" could be used in connection with electricity; and as the flow of water was along the main in respect of force and friction, so was electricity along wires. He also explained by a reference to an ingenious hydrant invented some years ago by Mr. Greathead, with which water at different pressures was employed successfully in extinguishing fires, the principal of the electrical transformer, whereby a pressure of 2000 volts could be brought inside a house, and used at (say) a pressure of 100 volts without the loss of more than 10 per cent. He also explained how electricity was used for the purpose of generating heat in the process of welding. In conclusion, he said it was obvious that for electrical, and for an innumerable number of purposes, the applications of science to industry became day by day more necessary, and the study of these, and the knowledge how to make the applications, became more and more essential. It was for this reason that institutions such as the Heriot-Watt College demanded their increased recognition and support.

At the conclusion of the address, a vote of thanks was passed to Sir Frederick Bramwell.

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THE EFFECT OF FOG ON THE CONSUMPTION OF GAS IN BIRMINGHAM.—The following figures show the consumption of gas in Birmingham during the foggy week, which commenced on the 31st ult., and that during the corresponding week last year, which began on Jan. 2:—

| | Week beginning Dec. 31, 1888. Cubic feet. | | Corresponding week last year. Cubic feet. |
|---|---|---|---|
| Monday | 17,537,000 | .. | 16,920,000 |
| Tuesday | 20,442,000 | .. | 16,858,000 |
| Wednesday | 18,253,000 | .. | 16,570,000 |
| Thursday | 22,751,000 | .. | 17,102,000 |
| Friday | 18,294,000 | .. | 16,779,000 |
| Saturday | 17,247,000 | .. | 14,865,000 |
| Total | 114,524,000 | .. | 99,094,000 |

LIVERPOOL ENGINEERING SOCIETY.—At the meeting of this Society on the 9th inst., a paper, on "The Application of Atmospheric Air to Produce Motive Power," was read by Mr. A. W. Brightmore. After giving a short account of the thermodynamics of gases, Mr. Brightmore showed that the efficiency of a steam-engine was limited by the loss of temperature between the gases in the furnace and the water in the boiler. Some hot-air engines were, he said, open to the same objection; and others which had not this defect lost efficiency by insufficient expansion. In the gas-engine—a species of air-engine, the working substance being air to which heat was applied in the most direct manner by the combustion of the gas—the amount of expansion obtained was greater than in the air-engine. The gas-engine, therefore, worked between wider limits of temperature, and was consequently more efficient than either the steam-engine or the hot-air engine.

# Correspondence.

*[We are not responsible for the opinions expressed by Correspondents.]*

## ESTIMATING THE COMPARATIVE VALUE OF COAL.

SIR,—Your correspondent, Mr. Thomas M'Dermott, appears to have overlooked the fact that in Newbigging's "Handbook" it is stated (above the example referred to) thus: "To ascertain the relative value per ton of different coals, attach approximate or *actual market prices* to the sperm pound and to the several residual products; add the various items; and compare by proportion." I take it the value of the gas estimated in pounds of sperm, also the value of the coke, tar, and ammoniacal liquor, will vary largely in different towns. Hence the figured-out example is only given to show plainly the manner of calculating and comparing the values of two samples of coal. For instance, in my case, Mr. M'Dermott's calculation would not be applicable, if I adhered in moneying-out the value of gas and residuals, strictly to the figures he gives for them.

When estimating the relative values of coal for gas-making purposes, I prefer to multiply the number of cubic feet of gas made per ton by the illuminating power of same, which gives candle feet; and this is then monied-out at the approximate value of the gas. Thus, taking the examples already given, their value to us would be as follows:—

| No. 1 Coal, quoted at 12s. 6d. per ton, yielding 10,600 cubic feet per ton of 17½-candle gas | £ | s. | d. |
|---|---|---|---|
| 10·6 × 17½ = 185·5 . at 1d. per 1000 cub. ft. = | 0 | 15 | 5½ |
| 13½ cwt. of coke . . at 4d. per cwt. = | 0 | 4 | 6 |
| 10 galls. of tar. . . at 1½d. per gallon = | 0 | 1 | 3 |
| 22 „ of ammo. liquor at 1d. per gallon = | 0 | 1 | 10 |
| | £1 | 3 | 0½ |

| No. 2 Coal, quoted at *x* per ton producing 9700 cubic feet per ton of 16¾-candle gas | £ | s. | d. |
|---|---|---|---|
| 9·7 × 16¾ = 162·5, at 1d. per 1000 cubic feet = | 0 | 13 | 6½ |
| 14 cwt. of coke. . . . . at 4d. per cwt. = | 0 | 4 | 8 |
| 9 galls. of tar . . . . .at 1½d per gallon = | 0 | 1 | 1½ |
| 20 galls. of ammo. liquor . at 1d. per gallon = | 0 | 1 | 8 |
| | £1 | 1 | 0 |

If No. 1 is worth 12s. 6d. per ton, No. 2 will be worth

$$276{\cdot}5 : 252 :: 150 : x \quad \therefore x = \frac{252 \times 150}{276{\cdot}5} = 136{\cdot}7\text{d. or } 11\text{s. } 4{\cdot}7\text{d. per ton.}$$

I venture to think the above method is simpler than reducing to a standard of 20-candle gas; and the value of gas produced is taken approximately at what it costs us for coal and working expenses, less residual products. Also the values of coke, tar, and ammoniacal liquor are monied-out at the prices we actually obtain for them, less expenses incurred in working any of them up, or in labour and cartage.

*Stafford, Jan.* 12, 1889. J. FERGUSON BELL.

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## THE GAS INSTITUTE.

SIR,—I have to thank you for your courtesy in inserting my letter upon this subject; but your criticism is, I think, unjust.

I say that it is the trading element among gas engineers and members of the Institute which has placed it in its present position. In plain terms, if the gas managers or engineers had never had any connection with trading or manufacturing companies for their own especial profit, The Gas Institute would never have known the dissensions and splittings-up which are now witnessed. If the Institute make it a rule to exclude all gas engineers or managers having a trading interest, it will flourish; and very few of the traders will have a desire to obtrude themselves, or wish to become members of the Institute. In short, let gas managers rid themselves, once and for all, of the *trading element among themselves* before they cast the stone at others—the legitimate traders, whom they desire to exclude, and whom they have a perfect right to exclude directly they are free from the blame of being traders themselves. Is it not the fact that the one reason that has made *bonâ fide* traders anxious to get within the walls of the Institute, is their seeing that they are totally excluded from doing business with gas-works whose managers have some interest in a trading or manufacturing company?

You, Sir, must know this; and surely you do not stand up as the exponent of such a system, or seek to defend it for one moment. It must be better that what is known to exist as an evil is looked at as an evil, and sought to be got rid of, than to blink the question and let the same evil go on to everlastingly pester every gas manager or engineer who seeks to be looked upon as, and is, an honest man before the world, who will give all traders fair play—buying for his company in the cheapest and best market, and selling for them in the dearest and best.

This evil, of the gas engineer and manager being a trader outside his works with people who do business with his works—or, on the other hand, receiving commissions, with all its attendant evils—is the one and the only cause of the present condition of The Gas Institute. By all means exclude traders in the future, if a majority of the members desire it, and also exclude all who are traders practically—who receive commissions from traders, or who are connected with this or that company as shareholders or in some way to receive a profit on the orders they give or the sales they make. The "high standard" to which you so feelingly allude, is not a high standard when we try the poor wretch for stealing a loaf to prevent starvation; but it is a high standard forsooth when it is within the knowledge of almost every person that thousands of pounds are paid annually as commissions and tips or profits (with all its attendant evils), and representing twenty times that amount of loss in some form or other to the shareholders or ratepayers interested in gas-works. The honest trader is snubbed, who will not give himself to such a system; and the dishonest trader or manufacturer is fawned upon and welcomed who will do the dirty work. High standard, Sir! Yes; and let the high standard apply to every member of The Gas Institute in future. Otherwise this constant dissension and bitterness will always be. Let the Institute once and for ever be down with the practice that has sought to shield any of its members accused or suspected of malpractices. Let them have the high standard of all honest men; and they will have the respect and esteem which all honest men desire and deserve.

I would, by way of a note, however, ask the gas engineers of the past

25 years one question. Whom have they to thank for making the residuals from gas-works into marketable products and of high commercial value? Have these discoveries been made inside the gas-works, by the brains of the gas engineer and by the capital of the company; or by the capital and brains of traders outside the gas-works? The discovery or invention have too often been taken advantage of in the interest of the gas company; and the trader too often ruined. Traders may, I think, yet deserve the gratitude of gas companies; but they seldom get it.

*Forest Hill, S.E., Jan.* 19, 1889. SAMUEL HAYWARD.

## MR. BRAY AND THE GAS INSTITUTE.

SIR,—As Mr. George T. Livesey is again playing the rôle of Mr. Facing-Both-Ways, by posing in your last issue as a person who had not denounced gas managers as being almost universally corrupt, permit me to refer your readers to pages 3, 4, and 5 of the pamphlet on "Corrupt Practices in the Gas Industry," which I sent to the members of The Gas Institute in June last. Therein will be found some of the statements made by yourself against gas managers, and the endorsement given to your accusations by Mr. Livesey. Besides this, Mr. Livesey fanned the popular feeling against gas managers by his public speeches, and by the issuing of a circular from his Company relating to the subject of corruption in the gas trade. Permit me further to say that your own and his testimony have been quoted as evidence against gas managers in newspapers and in gas committees all over the kingdom.

Seeing you did good service to the gas industry by copying into your pages on the 8th inst. a letter from me which had appeared previously in the pages of the *Gas World*, and as you have made comments on that letter, and also allowed Mr. Livesey to do so, I think I may fairly ask you to reproduce in your pages a second letter addressed by me to your contemporary, a copy of which I give below.

*Leeds, Jan.* 19, 1889. GEO. BRAY.

[ENCLOSURE.]

To the Editor of the *Gas World*.

Sir,—It has been represented to me by several gentlemen, on behalf of themselves and others, all of whom are friends of The Gas Institute, that my letter which appeared in your pages on the 5th inst., indicated hostility against the Institute and the remnant of the Council who are endeavouring to keep it from disintegration.

I had no intention to express any hostility against the existing Institute, or the remnant of the Council who are standing to their guns; nor do I think that such an impression ought to be received from a perusal of my letter. But as such a mistaken impression does exist, permit me to say that, so far as I have any feeling in the matter, it is in favour of the maintenance of the Institute under just management. The North British Association of Gas Managers has such management; and so have some of the District Associations in England. If The Gas Institute be conducted similarly, I shall let bygones be bygones, and give it my cordial support, should it be required.

But my friendly wishes extend only to the remnant of the Council and the general body of the members, and not to the late governing clique whom the action of myself and other real friends of the Institute succeeded in eliminating. As I indicated in my former letter, that clique is now scheming to again secure power by raising up a rival Institute; and it was against them, and their enmity to the existing Institute purified from their presence, that I declared hostility.

If, in conclusion, I may offer advice to gas managers generally, I would say: As you have been growingly dissatisfied with the management of the clique, apart from my affair, do not again put yourselves in their hands, or they will again use you for their own purposes, and again betray and denounce you as being almost universally corrupt, when such a course seems necessary to them to divert attention from their own evil and corrupt conduct.—Yours, &c.

*Leeds, Jan.* 17, 1889. GEO. BRAY.

## PUBLIC LIGHTING BY OIL.

SIR,—Since you courteously inserted my letter of Aug. 1 last year, I have been residing in the very hotbed of public oil lighting—Wimbledon; and whether at Erith or at Wimbledon, I note that when these oil-lamps are properly trimmed, properly adjusted and kept adjusted, properly filled, and supplied with proper oil, they give a fairly good light for an hour or two; but "there's the rub." Somehow or other, the men employed for this work seldom attend to one or other or all of these matters *properly;* and in consequence, after they have been lighted an hour or so, they begin to show signs of "something wrong," and, unless they are readjusted (turned up or down), a large number either give insufficient light or begin to flare and smoke and crack the glasses, and then collapse. The want of uniformity in the illuminating power is evidence of the fact that something is not right. Having witnessed the oil lighting at Wimbledon for about five months, I say that after a few hours the oil-lamps are vile, execrable, detestable, and disgusting, in this the Nineteenth Century.

The Local Authorities here having lately received tenders for electric lighting, and for gas also, is in itself evidence that public lighting by oil is not at this date giving general satisfaction; and it was stated during the recent County Council contest that the cost for gas was some 30s. or 40s. per lamp per year *less* than the cost quoted or named for the electric light. As to Wimbledon, we may fairly hope that public lighting by oil will soon be a thing of the past, and as to Erith, the flourish of trumpets that was made a short time since has given place to a very loud howl of dissatisfaction. The lamps being fitted on the top of the lanterns, a quantity of oil has been spilt over the asphalte pavement, to such an extent that the Chairman of the Local Board had to call attention officially to it. In a recent issue you noted that 90 of the lamps had either not been lighted or had gone out, and that the Local Board had exercised its clemency and condoned the offence (in other words, did not enforce the penalty of 2s. 6d. per lamp per night for breach of contract); but at the last meeting of the Board, the complaints were very general, and the Chairman reported that ten lamps were not alight one evening, and six out on another.

The Board are now thoroughly alive to the fact that somehow or other a number of these lamps "go queer" every night, and that the words "successful lighting" must be received with certain "grains of salt" understood in a very qualified sense—namely, "as successful as can be reasonably expected from oil." But what can one expect from oil? The contract has some two-and-a-half years yet to run. The oil-lamps have been bought, and must be paid for, and the Board are trying to make the best of a bad bargain. Innocent honourable gentlemen, all that they have done has been purely in the interest of the poor ratepayer, and the benefit of the British public.

In conclusion, one fact is worth more than a thousand opinions of mine. A gentleman of unimpeachable veracity told me the other evening that he had to pass ten oil-lamps every night on his way from the station to his residence, and that each night ever since they were first lighted up, something had been wrong with one or other of them. We have our difficulties with gas-lamps; but we have nothing to fear from public lighting by oil in the long run. *Nil desperandum.*

*Jan*, 18, 1889. R. P. KEYS.

## WEST'S WIRE-ROPE STOKING MACHINERY.

SIR,—Allow me space in your next issue to thank my friend, Mr. C. C. Carpenter, of Vauxhall, for his complimentary remarks upon my recent successful efforts in connection with stoking machinery. At the same time, I wish to state that I have not presumed to take the credit of the original conception for working machines by endless wire-ropes. I believe, however, that I am the first to have brought stoking machinery driven by these means to a complete and successful issue; as can be seen at the Blackburn Gas-Works, where the machinery is at the present time working upon 24 beds of retorts.

I believe Mr. Carpenter is in error in giving the credit of the original idea to Mr. Warren, of Crewe. I think the credit is due to Mr. J. J. Holden, of the firm of Best and Holden; for it is historically recorded and illustrated in the first volume of "King's Treatise on Coal Gas," and also found in the patent records, that Mr. Holden designed and patented machines to be driven by wire-ropes about 3½ years prior to Messrs. Warren and Wates taking out their patent for stoking machinery, which was driven by cotton ropes.

*Manchester, Jan.* 18, 1889. JOHN WEST.

## GAS SUPPLY IN JAPAN.

SIR,—I have read a letter which appears in your last issue, under the above heading, in reply to mine of Oct. 16 last. I think your correspondent has got into a fog as regards Japanese money and its equivalent in English, and the price at which his gas is sold. The Japanese yen (gold, silver, or paper) is current value for 100 cents in Japan. The 5 yen gold coin is the same weight and alloy as our sovereign; and it circulates in the country at 500 cents, as our sovereign does in Britain. If your correspondent enters a store in Japan, makes a purchase to the extent of 50 cents, and tenders a yen in payment, he will receive 50 cents in change. So if the Tokio Gas Company sell their gas at 2 yen 70 cents per 1000 cubic feet, that is 11s. 3d.—not 10s. 9d. as previously stated—neither more nor less, if you compare the yen and sovereign as circulated in their several countries. But the current rate of exchange has nothing to do with the sale of gas in Japan. It is a native Company, having all the raw materials for the manufacture of gas in the country, and with no occasion to exchange their money for English in its production. So that I think it is your correspondent who is "labouring under a false impression as to the value of Japanese money." But when he has been as long in the country as I was, he will be better posted as regards its money value. I may also inform you, for the edification of your correspondent, that I have received 106 cents for a Japanese yen—that being the current rate of exchange at the time.

*Dungannon, Jan.* 16, 1889. R. ROSS.

SWANSEA CORPORATION WATER SUPPLY.—At the meeting of the Swansea Town Council last Wednesday, the minutes of the Water Committee recommended that, before constructing a service reservoir at Morriston, an experiment be made with the Cwmdonkin Reservoir, and that with this view £194 be spent in connecting another pipe with the reservoir, at a depth of about 8 feet below the overflow level. Some experiments, it was mentioned, had been made during the past month, with a view of testing the waste of water; and it was discovered that on one night in one street it was at the rate of 15 gallons per head. The Engineer was directed to make further tests; and the minutes were confirmed.

THE QUALITY OF SALFORD GAS.—At a recent meeting of the Barton Local Board, attention was drawn to the numerous complaints in the district as to the bad quality of the gas supplied by the Salford Corporation. The gas had become so bad in quality that many people were adopting oil-lamps in its place. The Chairman (Mr. Mellor) said for some years he upheld the quality of the Salford gas; but since he had taken up his residence at Bromyhurst—one of the outlying suburbs of Barton—he had found the gas very inferior indeed. It was not only deficient in illuminating power, but the smell emitted from it was injurious. The Clerk was ultimately instructed to write to the Salford Corporation on the subject.

RIPON CORPORATION GAS AND WATER SUPPLY.—At the last meeting of the Ripon City Council, the Town Clerk, in answer to a question, stated that the amount borrowed on the new water-works was £25,000; and of this sum there was a balance in hand of £950 on Jan. 1. A discussion took place with regard to the price of gas, upon which question the Town Clerk had prepared a report. It stated that during the year ending Sept. 29, 1887, the income from the undertaking amounted to £3997; and during the year ending Sept. 29 last, to £4314. There was an increase in the quantity of gas sold of 715,300 cubic feet; and also an increase in the receipts from the sale of residual products, of £101—the gross increase in the total receipts for 1888 being £317. The price of gas had been reduced from 4s. 7d. per 1000 cubic feet in 1878 to 3s. 6d. at the present time, with an allowance of 5 per cent. on accounts paid within a month. The revenue account would receive no relief until the year 1900, when there would be a reduction of £600 per annum, owing to the extinction of debt. Alderman Hargrave suggested that the consideration of the question should be left over for the next meeting, in order that the Council might have an opportunity of examining the Town Clerk's report. Alderman Lee stated that since the purchase of the gas-works by the Corporation, they had expended £7975 on capital account. He objected to further borrowing powers on the gas-works, because there was no doubt that the electric light was the light of the future. Alderman Baynes afterwards moved the following resolution:—"That all consumers of gas for cooking-stoves and gas-engines be allowed a discount of 10 per cent. for payment within the month half-yearly, provided that they pay all costs of alterations of pipes (if any), and pay rent for a separate meter of per annum." The resolution, after a short discussion, was carried.

# Legal Intelligence.

## HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

WEDNESDAY, JAN. 16.

(*Before Mr. Baron* HUDDLESTON *and Mr. Justice* WILLS.)

BRISTOL WATER-WORKS COMPANY *v.* THE MAYOR, ETC., OF BRISTOL.

This was a special case stated, mainly for their Lordships to decide whether or not the quays of Bristol were streets within the meaning of the Act, so as to entitle the Company to the cost of the removal of their pipes by the action of the Corporation.

Mr. HENN COLLINS, Q.C., Mr. BULLEN, and Mr. CLIFTON appeared for the plaintiffs; Mr. POOLE, Q.C., Mr. PITT-LEWIS, Q.C., and Mr. COLYER for the defendants.

Mr. COLLINS said that the Bristol Water Company, by their Act of Parliament, were bound to have water in convenient places along the quays of Bristol, for the purpose of supplying the shipping interest. By one section of the Act, it was provided that, if the Corporation had to alter the levels of the streets at any time, so as to involve an alteration in the position of the pipes, they were to pay to the Company the cost of shifting the pipes. The Corporation had, as a matter of fact, made some changes in the levels of the quays, necessitating alterations by the Company in the position of their pipes; and the Company claimed from the Corporation the cost incident to such alterations. The point taken against the Company was that the quays were not streets; and that, therefore, the Corporation were at liberty to impose any such alterations of the pipes as they chose, and were not responsible for the cost incident thereto. The principal point their Lordships had to decide was whether or not the quays of Bristol were streets within the meaning of the Act, so as to entitle the Company to the cost of the removal of their pipes. The amount of money in dispute was not a large one—only £12 0s. 9d.—but the question at issue was one of considerable importance between the two bodies. Counsel proceeded to read from the special case, which set forth that by the Bristol Water-Works Act, 1862, it is enacted: "Section 72.—The Company shall maintain pipes at convenient spots upon the quays and docks in the city and county of Bristol, so that masters of vessels may supply themselves from the said pipes by means of hose, to be provided by the Company, into their ships, under the control of the Company." The plaintiffs had, in accordance with this section, laid and maintained, and still maintain, mains and pipes upon the docks and quays, as required. Section 105 of the same Act said: "If any Board of Health, Turnpike Commissioners, or other persons entitled so to do, shall desire to alter the level, direction, or situation of any street or road within the limits of this Act, so as to render necessary the removal or the alteration of the position or level of any main or service water pipes of the Company, such Board of Health, Turnpike Commissioners, or other persons shall give to the Company notice of such desire; and the Company shall forthwith make such removal or alteration as may be so rendered necessary as aforesaid, and do all works incident thereto, and all expenses to be thereby incurred shall be defrayed by the Board of Health, Turnpike Commissioners, or other persons giving such notice as aforesaid." The defendants were the owners of the freehold of a quay, commencing at what was known as the Head of the Quay. A part of this wharf had been for more than 20 years a public road, and had been during the same period repaired by the defendants as the Urban Sanitary Authority; the cost of repair being paid for by means of the district rate. The quay had been for more than 170 years used as a wharf, for shipping coming alongside to unload their cargoes. The defendants, during these 170 years, had, by themselves or their tenants, exercised the right of erecting sheds, both open and enclosed, upon the quay or wharf, as and when the requirements and conveniences of the shipping coming alongside to unload their cargoes might demand. The defendants had also for more than 20 years repaired the pitching and walls of the quay. By the interpretative clauses of the Water-Works Clauses Act, 1847, the word "person" included the Corporation; and the word "street" embraced "any square, court or alley, highway, lane, road, thoroughfare, or public passage or place within the limits of the Special Act." The learned Counsel contended that on the findings in the special case, the quays and wharves here came within the definition of a street. The findings in the case were that the public had a free right of passage over all parts of the wharves that were not actually occupied by something incident to the nature of a wharf. In the old lease there was no distinction drawn between the part of the wharves and quays next to the houses and that part which was next to the river, except that, somehow or other, a custom had arisen for the owners of the houses along the side of the river to repair a certain portion of the land before their houses; but it was found in the case that for all practical purposes a wharf was a highway.

Baron HUDDLESTON: Is there evidence of dedication to the public?

Mr. COLLINS replied in the affirmative. It was, however, enough for him to say that this was a public place in the sense of being a public and open wharf. His learned friend might contend that it was difficult for him (Mr. Collins) to establish that this was a highway inasmuch as the defendants had the right to interrupt the highway by the erection of temporary buildings.

Baron HUDDLESTON remarked that the definition of the word "street" was very wide—viz., "any square, court or alley, highway, lane, road, thoroughfare, or public passage or place."

Mr. POOLE pointed out that in Bristol there was a large number of private wharves and quays, and that the Water Company were obliged under the 72nd section of their Act not only to supply the public quays and wharves with water, but also the quays and wharves of private owners. Section 105 had been quoted; but it could not be taken as applying to the private property.

Baron HUDDLESTON said the definition of a "street" appeared to include both public and private places. There must be a road by which to go to a private quay or wharf.

Mr. POOLE said that if the Court were really of opinion that the quay or wharf was a highway, he would not proceed. But he did not think that his learned friend intended to contend that the quay in question was a highway.

Mr. COLLINS observed that he was quite content to rely upon the fact that the quay was a public place.

Mr. POOLE admitted that the defendants were the freeholders of the quay, but maintained that they had in no sense dedicated it to the public.

Baron HUDDLESTON thought that "public place" was what Mr. Poole had to fight against.

Mr. POOLE contended that a "public place" was a place that was open to the public, not open of necessity to a limited number of persons who had dealings there; but open to any persons who chose to go there. But in the present case there was a quay or wharf which was not open to the public. It was open, but only to a certain limited number of persons. He allowed that the public went to the place; but that did not constitute it a public place. It had been laid down by learned Judges that railway stations, though places of public resort, were not "public places;" that railway companies had the right to exclude the public from their stations, except when a train was arriving or departing. He maintained that in the same way the defendants had a perfect right to exclude people from their quays or wharves, except when the quays or wharves were being used by reason of a vessel being moored there.

Mr. COLLINS observed that the finding in the case was that no one had ever been stopped.

Mr. POOLE remarked that the finding was that the defendants had not stopped anyone; not that they had not the power to turn anyone off the quays or wharves.

Judgment was reserved.

## MIDDLESEX SESSIONS—SATURDAY, JAN. 19.

(*Before Sir* P. H. EDLIN, *Assistant-Judge, and a Bench of Justices.*)

APPEAL BY THE EAST LONDON WATER-WORKS COMPANY.

To-day, the East London Water-Works Company appealed against a conviction by Mr. Lushington, sitting at the Thames Police Court, for neglecting and refusing to furnish to Mr. J. H. Johnson, the owner of two houses in Northey Street, Limehouse, a supply of water for those houses from the 28th of July to the 6th of August, 1888. The sentence imposed by Mr. Lushington was that the Company should pay a fine and costs amounting to £15.*

Mr. FORREST FULTON, instructed by the Treasury, now appeared in support of the Magistrate's decision; Mr. Poland, Q.C., and Mr. Besley represented the Company.

Mr. FULTON stated that the appellants had refused to supply Mr. Johnson with water, on the ground that he had no store-cistern or proper receptacle for water on his premises. The Company, by their Act of 1853, were required to give a constant supply of water; but, on the other hand, the owner of the houses was compelled to put up a cistern or other appliance, for the purpose of preventing waste of water at boilers, water-closets, or urinals. He contended that for all other purposes the Company should give a constant supply. In Mr. Johnson's case, there was direct communication to the appellants' main; and a cistern which held 2 gallons of water had been put in the closets. The pipe from the main, supplied as it was with a stop-cock, was, he maintained, a proper receptacle for the supply of water; but even assuming the Court held it was not a proper receptacle, the Company had no power under their Act to refuse or neglect a supply of water. The question at issue was one of very great importance to owners of small property in the whole of London; and particularly to Mr. Johnson, who, besides the two houses mentioned, had 64 houses in the same neighbourhood, which were fitted for water supply in the same way as the houses in question. Whenever the Legislature had sanctioned an intermittent supply, it had insisted on cisterns being used; but no such provision was made where the supply was a constant one.

Mr. POLAND, for the appellants, submitted that the tendency of all Acts relating to the supply of water, since 1847, had been to cause cisterns to be erected. It was not reasonable to suppose that a ½-inch pipe from a main was a proper receptacle for water. The Company's Act provided that there must be a proper cistern or other receptacle, fitted with a ball-cock, or that other apparatus should be used. The small cisterns put up in Mr. Johnson's houses were simply used for the water-closets and for the purpose of preventing persons using more water than was necessary for sanitary purposes. He further contended that cisterns were absolutely necessary; for, in the event of any accident occurring to the main, the inhabitants of houses would be without water for a considerable time.

Mr. BESLEY was also heard in support of the appeal, and contended that in certain circumstances it was absolutely necessary there should be a 64-gallon cistern in every house, and that it was not reasonable that, for the sake of 30s.—the cost of such a cistern—owners of property should not be called upon to provide them.

The ASSISTANT-JUDGE said the question for determination was whether the fittings for the supply of water in these houses were such as to make it a statutory obligation on the part of the Company to lay on water. The question was not whether the requirement of a cistern or other receptacle from which water was to be drawn for domestic purposes, irrespective of a cistern for water-closets, was a reasonable one or not, nor whether it had been the practice of the Company heretofore to enforce such a requirement, but whether it was one which the Company might, under the 64th section of their Act, lawfully impose on the owners. That section, according to the interpretation put on it by the Court, did not limit the requirement with regard to a cistern to one to be used only for water-closets or soil-pans. There was no such limitation implied. The Court was, therefore, of opinion that the actual fittings in this case did not amount to such a receptacle as the Company were entitled to require, though it would seem that heretofore—the requirement being permissive, and not absolutely necessary—they had dispensed with it. The Court was therefore of opinion that the Company were not guilty of any offence in refusing to supply water under the circumstances stated; and the conviction must be quashed.

No order was made as to costs.

## DUBLIN RECORDERS' COURT.—TUESDAY, JAN. 15.

(*Before the* RECORDER.)

FITZGERALD *v.* THE ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

WRONGFULLY DISCONNECTING A GAS-METER.

This was an appeal from the decision of a Magistrate, inflicting a fine of 10s., with £3 3s. costs, on the appellant, for having disconnected the meter in his house from the gas-pipe, in contravention to the 15th section of the Gas-Works Clauses Act of 1871. It appeared that in October last Mr. Fitzgerald went to the offices of the Gas Company and complained that the meter at his house was not registering properly, and requested that it should be tested. Next day one of the inspectors of the Company went to examine the meter; but found it had just been disconnected by direction of Mr. Fitzgerald, and taken to the testing house. It was contended on the part of the respondents that Mr. Fitzgerald had not given the necessary notice under the statute previous to disconnecting the pipe. This was controverted on the part of the appellant. Evidence was given to prove that the index of the meter was out of order, and registering against the consumer. Mr. Fitzgerald averred that Mr. Cassidy, an official of the Company, told him to take the index to the testing office.

The RECORDER, during the arguments, commented strongly on the fact (as alleged by the Company) that the Inspector of Public Lighting, while allowed to condemn meters out of order, was not permitted to examine them to see in what respect they were wrong, and that these meters were returned to the Gas Company, without being broken. He (the Recorder) would, for his part, give him that power until the legality or illegality of the matter was decided. If there was something very wrong about them, the Company would never tell the public, who, in the opinion of his

* See JOURNAL, Vol. LII., p. 555.

Lordship, were entitled to know the reason. If the Company were acting *boná fide*, why did they not notify to their customers that the removal of meters was not allowed, instead of asking people to wade through Acts of Parliament. He believed Mr. Fitzgerald had no idea he was breaking the law. At the same time he thought the public had no right to remove gas-meters. He reversed the decision of the Magistrate by decreasing the penalty to 1d., without costs.

KENSINGTON PETTY SESSIONS.—Tuesday, Jan. 15.
(*Before Mr.* W. Bird *and a Bench of Magistrates.*)

A WATER COMPANY'S REFUSAL TO FURNISH A CONSTANT SUPPLY.

The West Middlesex Water-Works Company appeared to-day on a summons issued at the instance of Mr. Charles J. Tappenden, of Gunnersbury College, Chiswick, for refusing to furnish a constant supply of water to his premises.

Mr. Atherley Jones, M.P., supported the summons; Mr. Mead represented the Company.

Mr. Atherley Jones, in detailing the facts of the case, said it was one of considerable importance to the public generally; and it was taken up practically on behalf of the people of Chiswick. The neighbourhood was rapidly developing; and the inhabitants were often without water, and none was kept in the mains for use in case of fire. The whole of this large district was without a constant supply of water. The Company said they were willing to give a constant supply, if Mr. Tappenden laid down a pipe for a distance of 130 yards to a main which was kept constantly charged.

The Chairman: Am I correct in understanding that the Company are willing to furnish a constant supply?

Mr. Atherley Jones: Yes; but we are under no obligation to lay the pipes.

Mr. Mead maintained that the Company were not bound to grant a constant supply of water; and he said that if any person desired a constant supply, the Company would grant facilities for it. The Act of Parliament did not say positively that they should do it. The Company, therefore, were under no obligation to grant a constant supply; and he went on to explain the difficulties which a water company would have to put up with if his contention was overruled. He said that one inhabitant might desire a constant supply, and another would not wish for it. This, he urged, would cast upon the Company the responsibility of laying two mains, to suit the convenience of different inhabitants.

The Chairman: A stopcock would remove all difficulties in that direction.

After some further discussion, the Bench ruled against Mr. Mead's contention, and expressed an opinion that it was the duty of the Company under the Act to provide a constant supply when demanded. A nominal penalty of 20s. was imposed; and a case was granted for the Superior Court.

Improved Gas and Coke Manufacturing Syndicate, Limited.—This is the title of a joint-stock concern registered on the 8th inst., with a capital of £10,000, in £1 shares, to carry on business as gas and general engineers, and to acquire and work patent No. 15,728 of 1886, for "An improved method of, and apparatus for producing or manufacturing gas for illuminating or other purposes," taken out by a Mr. F. J. Jones.

The Alleged Lead-Poisoning by the Bradford Corporation Water.—It is reported that in Wyke and Low Moor, the number of persons suffering from lead-poisoning is daily on the increase. Dr. Whitterton, the Medical Officer for the North Bierley Local Board, says that he has at least a dozen well-defined cases in hand at present; and two or three fresh ones crop up every day. In individual instances the patients have suffered very severely. Another medical man has also about seventeen cases; and in about a dozen of these the symptoms have been very acute. Dr. Greenbury, of Bradford, also reports a number from Wibsey; and there are others in the district. A sample of water taken from a gentleman's house at Low Moor and analyzed was found to contain three-quarters of a grain of lead per gallon. Samples of water have been taken for testing purposes from the Low Moor district by the Bradford Borough Surveyor and the Corporation Engineer.

Northern Coal Trade.—There has been increased activity in the northern coal trade in the past few days; and with a normal output, the price has been steadily maintained. Very large contracts are now in course of negotiation for steam coals, including contracts for the Danish and Swedish State Railways, which together amount to 144,000 tons; but a considerable portion of which is expected to go to Scotland on account of the lower prices of coals there. Gas coals are in brisk demand. Indeed, one or two of the large local companies have had to buy more coal beyond the quantities contracted for, and for which they have had to pay rather heavy prices. Where there are not contracts, the current prices given are from 7s. 6d. to 8s. for best qualities of gas coals f.o.b. in the Tyne. The demand for gas, however, shows signs of the usual falling off, with the lengthening of the days; but it may be said that all the companies in the north have had largely increased sales, and consequently a much greater consumption of coals. They have been able, also, to obtain advanced prices for coke for shipment. For coal for ships' use, there is a good demand, and that at steady prices. The requirements for household coal are weaker, though the price is not yet affected.

The Rastrick Water Company and the Local Board.—On Monday last week, at the invitation, it is stated, of the Mayor of Halifax (Alderman Booth), representatives of the Rastrick Water-Works Company and of the Rastrick Local Board proceeded to Halifax, and had an interview with the Mayor respecting the water supply of the district. After a protracted discussion, a basis of agreement was drawn up, the full text of which, however, it is not considered advisable to make public, but it is generally understood that the Water Company's application to Parliament for incorporation will be withdrawn. A special meeting of the Rastrick Local Board was held last Thursday, when the Solicitor (Mr. S. Wright), addressing the reporters present, said the Board were considering the draft of an agreement between the Company and the Board, by which, subject to the approval of the Local Government Board, they agree to purchase the undertaking of the Company at a price to be fixed by an Arbitrator. The Arbitrator was to be agreed upon within a month after the confirmation of the agreement; and failing agreement, he was to be nominated by the President of the Local Government Board. The agreement was conditional upon its being approved by the shareholders of the Company and by the Local Government Board. If either refused to confirm the agreement, it would drop; and each party would be in the same position as if no agreement had been made. It was intended that confirmation of this draft agreement of the Company should be accompanied by an alternative offer of a fixed sum, to avoid, if possible, the costs of aribitration. This fixed sum would probably represent a greater value than the Board themselves put on the undertaking; but it would be made for the sake of peace, and to avoid the trouble and anxiety, as well as the cost, of a protracted arbitration.

# Miscellaneous News.

## MR. ELLIS LEVER AND THE LEEDS CORPORATION GAS-COAL CONTRACTS.

Mr. Ellis Lever has telegraphed to call our attention to the following letter which he has addressed to the Leeds newspapers, and one of which published it yesterday:—

Sir,—Articles continue to appear in the journals specially devoted to the gas industry, in regard to the behaviour of the Leeds Gas Committee and they give expression to the general opinion that gas matters at Leeds are in anything but a satisfactory condition.

If the Gas Committee had not seen fit for some reason to stifle inquiry, I should undoubtedly by this time have shown them why the gas-works belonging to the ratepayers of Leeds are not realizing a large profit, instead of a loss of £17,000 in a year.

I am tolerably well acquainted with the gas-works of this country; and I venture to assert that there is not in any town I know clearer indication of maladministration than in Leeds. Were the ratepayers in possession of the whole facts, which, but for the action of the Committee, they might have been, there would have been great changes in connection with the Gas Committee and the department under its control.

I cannot, under the circumstances, press my offer upon the Leeds Gas Committee. They have had the opportunity of learning from me how much of the leakage occurs; but they have refused my offer, although the acceptance of it would not have involved the outlay of a single penny. When, as will ultimately happen, the information they now refuse *does* come to their knowledge, it will be in another form.—I am, Sir, yours faithfully,

Ellis Lever.

*Jan.* 19, 1889.

## THE LONDON COUNTY COUNCIL AND GAS AND WATER QUESTIONS.

The first election of members of the London County Council took place last Thursday; and the previous day the *Pall Mall Gazette* published a complete list of the candidates, with their indication of the members they would wish to see returned. With such a matter we have here nothing to do; but—in view of the importance of the issues, and of the difficulty always experienced in London of obtaining publicity in local matters—our contemporary sent a circular to all the candidates, requesting them to answer a series of questions drawn up so as to embrace the main issues involved in, or imported into, the contest. A large majority of the candidates replied, often with great elaborateness, to this invitation; and the answers received were tabulated under various headings. The questions most nearly concerning readers of the Journal are the fifth, sixth, and tenth, which were:

5. Are you in favour of obtaining powers to put the water supply of London in the hands of the people of London?
6. Are you in favour of obtaining powers to revise the existing arrangements with the Gas Companies, with a view of supplying light to the people at the lowest possible cost?
10. The collection of the Coal Dues will continue until July 5, 1889. The Metropolitan Board of Works and the City Corporation have given notice of a Bill for next year to renew them. Such Bill cannot, however, become law unless, and until, the London Council has agreed to it. Are you in favour of the renewal of these dues?

It is said that nearly all the candidates who replied answered Nos. 5 and 6 questions in the affirmative. The only exceptions were Mr. W. Blott (Holborn), who said "No" to both, and Sir Thomas Farrar (East Marylebone) and Mr. J. Coppen (Westminster) who said "No" to No. 6.* There was, however, more diversity of opinion as to the coal dues—26 candidates being for their renewal, 3 doubtful, and 122 against.†

In discussing the replies, the *Pall Mall Gazette* says, as to the gas and water supply question: "The candidates who answered the questions under these heads are so unanimous as to render any summary unnecessary. Everyone, that is to say, is in favour either of acquiring the existing monopolies on fair terms or of starting a competing scheme. In the case of gas, several candidates look to a municipal system of electric lighting as the means of supplying the people of London with light at the lowest possible cost. We subjoin a few interesting answers:—

Mr. John Hutton (South St. Pancras): The question of a new water supply is quite practical, and would bring down the price of the old Companies. The electric light must be the light of the future; and with this I would fight the Gas Companies.

Mr. Charles Harrison (South-west Bethnal Green): Most certainly. Municipal water-works are in existence in about twenty towns (none with a less population than 50,000). The profit receipts are applied to reduce the rates. As regards gas, 24 Corporations have municipal gas-works. Only 19 towns outside the Metropolis are supplied with gas by private capitalists—municipal expenditure on gas has been £12,367,008.

As to the renewal of the coal dues, our contemporary says: "If our answers are fairly typical of the future Council, the coal dues, it is clear, are doomed. Nevertheless, there is, we cannot but think, a good deal to be said on the other side; and the answers which we give below, at any rate foreshadow an interesting debate. The question in our circular included also the wine dues; but as the amount in this case is comparatively trifling, and some who were against taxing coal were in favour of taxing wine, we have thought it better to simplify the issue by confining it to coal."

Rev. Mitchell Cox (South Paddington) said: I think the dues are as free from vexation as any taxation I am acquainted with.*

Mr. E. Rider Cook (Bow and Bromley): If the funds are applied *only* to two purposes, I am in favour of their continuance. (1) *To Thames communication.*—All London has contributed for years to these dues. They have been spent almost exclusively in West London. I think all London should contribute, and the proceeds be spent in East London. (2) *To open spaces.*—These improvements are of a character which may give rise to delay. "Not needed yet." If so, the economical party will object to them being carried out by direct taxation. I regard them as so important that I would sooner raise the money by indirect taxation than not get it at all; without limitation I object to their continuance.*

Finally, Mr. J. S. Fletcher (Hampstead), in supporting the continuance of the coal dues, makes a very ingenious point. He says: "The coal dues should be continued until Question 6 is settled; otherwise the Gas Companies, enriched by the abolition of the dues, will demand greater compensation when they are absorbed by the County Council."

* None of these candidates secured a place on the Council.

† Of the candidates who replied to this question, 62 were returned as members and their opinions on the subject of the coal dues are: For the renewal, 10; doubtful, 2; against, 50.

## EUROPEAN GAS COMPANY, LIMITED.

A Half-Yearly Extra-ordinary General Meeting of this Company was held on Monday last week, at the London Offices, 11, Austin Friars, E.C. —Mr. H. M'Lauchlan Backler in the chair.

The Secretary (Mr. W. Williams) read the notice convening the meeting, and also the following report of the Directors :—

The past half year affords but few remarks of interest to report to you. Further advance has been made in increasing the business of the Company, although, in some cases, the progress has not been considerable.

At the beginning of the winter, coke was readily saleable at prices better than those realized in the previous year ; but the subsequent mildness of the weather caused the demand to slacken, and at the present time it is impossible to say what the ultimate result of the year will be in this respect. Tar has decidedly improved in value ; and the price of sulphate of ammonia has been well sustained.

The recent apprehension of extensive strikes in British coal mines, occasioned a general rise in price ; but this Company will not, for some time, be affected by it, owing to the coal and freight contracts extending over several years, of which a considerable period is yet unexpired.

An additional poll-tax on passengers using the ports of Boulogne and Calais is now enforced, on entering or leaving by sea ; and the amount produced is to be applied to the improvement and extension of the harbours of those places. The Directors venture to hope that funds will thus be provided for completing the deep sea harbour at Boulogne ; thereby increasing the importance of the town, and causing greater activity in business—a result which will satisfy the long-deferred expectations of its inhabitants, and all interested in its prosperity.

The outlay of the Company continues to be extremely limited ; and the state of trade in France does not at present offer a prospect of early revival to occasion much greater expenditure of capital.

In pursuance of the policy of the Board to secure by exclusive privileges the suburbs of the towns for which concessions have been obtained, the Directors have entered into a contract with the Municipality of Gruchet-le-Valasse, adjoining Bolbec for a term of years extending to the 30th of April, 1926. Although a small place, it is not unimportant, and contains several factories, and other establishments already supplied with the Company's gas.

In conclusion, the Directors express their undiminished confidence in the progress of the undertaking ; and whether this be slow or rapid, it will yearly add somewhat to the importance and prosperity of the Company.

An interim Dividend of 5 per cent. will be paid, free of income-tax, as usual, on the 1st of February next.

The Chairman : Gentlemen,—You have heard the report read. It is very brief, because there is very little to say ; and at this period of the year, it is always the same. We have no accounts to present to you ; and unless there is some event of importance which requires to be specially mentioned, we find it a trouble to frame a report at all. This has always been a difficulty with me as the various half years have recurred ; and really, considering the few shareholders who attend these half-yearly meetings, the little we have to say, and the difficulty in saying something when there is nothing to say, induces me to think—and the Board are all of the same opinion—that we might, with convenience to all parties, discontinue this half-yearly meeting. We pay you a dividend on the 1st of February ; but the dividend has nothing whatever to do with this meeting—it is merely an interim dividend paid by the Directors. We propose, if it meets with the approbation of the shareholders, to issue a circular, instead of sending you a dividend warrant merely, stating any point of importance that may have occurred, and to which we think it well to call your notice. What I have now stated will go round to shareholders who are not present to-day —that is, out of about 800, I should think 780—and they will express their objections, if they have any, either to the Secretary in writing or at the annual meeting. And if there is any objection raised, I will then take the sense of the annual meeting on the subject. I will now just make a few remarks on the report of the Directors. The aggregate increase of rental has not been very great. There has been an increase of business ; but trade is so very bad in France at the present time, and difficulties of various kinds occur so frequently, that we do not make the same progress as formerly. Going through the accounts, I find that about 1½ per cent. was the aggregate rate of increase at the seven stations of the Company during the half year ; and at two of the large stations we have an increase of 5 per cent. But the increase is very small at some, and *nil* at others ; in fact, at Boulogne—which is the black point in our affairs just now, there is a falling off even from the reduced amount which we had to state to you last year. As our present report says, it is our hope that the deep-sea harbour, which will be the communication between England and France for the landing of passengers from steamers, will soon be finished. The means by which this is to be done is stated to you—that is, by a poll tax. If this be a success, I think we may hope for something in that direction. But Boulogne at present is not a rising town. However, I do think, after all these difficulties with which we have had to contend, it is not unsatisfactory that we should have had an aggregate increase of 1½ per cent. One of the disadvantages of this half-yearly meeting is that we report to you on insufficient grounds. I know that up to the present time the increase on the seven stations is not exceeding 1½ per cent., but we have still several months, and generally good winter months for lighting before us, and, when the accounts are made up very probably this 1½ per cent. may increase considerably. Whether or not it will further progress, I cannot say ; and therefore I might be misleading you if I were to state more positively my own opinion on the subject. When we find there are two stations yielding an increase of about 5 per cent. each and others on a much smaller ratio, I think this proves at once the great advantage we have in possessing several stations. If we had but one, we should have our bright seasons ; and I dare say that we should also have dull times. But in our case we have what I will call our two bright stations ; and the increase at these more than makes up for the falling off in those which have not been so fortunate. We have been very successful with regard to tar and ammoniacal liquor. The value of these sub-products has increased materially ; and I am in hopes that there may be some further improvement. But this again is a matter on which it is very difficult to prophesy at this period of the year. The contracts for coal that we made about a year ago were very fortunate for us. We had reason to believe that the price of coal would increase—the coal-owners themselves believed it ; and we had great difficulty in getting them to make contracts for so long a period. However, we persuaded them to do it, and we now find the advantage. We are laying in our supply of coals, and we shall continue to do so for some time, at a lower price than they can be purchased in the market. With regard to the little contract of Gruchet-le-Valasse mentioned in the report, it is a contract which is actually made with the Municipality, but it still awaits the sanction of the Prefect of the Department—that is the superior authority. I have no reason to suppose that it will not be sanctioned ; but every reason to believe that it will. Then we shall have the benefit of this additional security. You know it has been stated before at these meetings that there is great advantage to the Company in securing its outposts. Whenever any district adjoining the principal towns lighted by us requires gas, by obtaining the exclusive privilege of lighting that suburb, we prevent any competition from establishing itself in the neighbourhood of those concessions ready to supply gas when they run out. It is looking a long time beforehand, no doubt ; but it is our policy—as it is in the coals, so it is in the concessions, and throughout the whole of the business which we conduct for you. With regard to the debentures, we have paid off £1900 within the last few days ; and we have £45,600 remaining. I may say we are ready to pay them off in whole or in part whenever it suits the convenience of the holders to claim repayment. We have the money invested. Now, as to the future. I quite concur in what has been said in the report with regard to the prospects of the Company being as bright as ever. I think at the present time we are passing through crises which are trying to all industrial undertakings, and more especially I think to a gas undertaking, which depends entirely upon the greater or less prosperity of the large establishments, as well as on the shop and household lighting in the towns where it carries on its business. This has been felt ; but whether it will continue to be felt to the same extent it is impossible to say with accuracy. I hope and believe we shall continue to prosper whatever may occur. Whether there be peace or whether there be war in the different countries of Europe, we know how we have on previous occasions met difficulties as great as we are now likely to encounter, and how we overcame them. Therefore we need not be despondent as regards the future. Financially our position is excellent, as you will see with greater clearness at the annual meeting when the accounts are presented. We have also what we never had before—a considerable accumulation of funds invested in good substantial securities, and that is a basis which we hope to enlarge by degrees in the future, and so ultimately to have all our different funds fully represented. I have to move—"That the report of Directors now read be received and adopted."

Mr. H. Solomon seconded the motion.

Mr. J. Blacket Gill said that the shareholders had just listened to a most interesting speech. He had one or two questions to ask. He believed the greater number of the Company's consumers belonged to the French working class ; and he wished to know whether stoves or gaseliers were lent to them, or whether they paid a rent for them, or whether they had to buy them. In another Company with which he was connected, they were inquiring into this business ; and he should like to know how it was being carried on in this Company. He would further like to know how often it was necessary to collect the rental among these people.

The Chairman, in reply, said that he thought the European Company might claim to be among the pioneers of the particular mode of encouragement of the consumption of gas to which Mr. Gill had alluded. They believed they were the first not only in France, but long before the custom was adopted in England, to lend out stoves for hire, and also different apparatus and chandeliers for lighting purposes. The rental they charged was a very moderate one, or otherwise they would fail in their object. With regard to the working classes, an association had, in the towns where there are large industrial establishments, built various places for the working classes where they had their general dwellings and lodgings, and this Company provided gas-fittings, and charged a very low rental for the use of them. The rental was paid monthly in most cases. The gas accounts were collected monthly in France everywhere. In cases where they thought it well not to let the accounts run longer, they were collected every fortnight.

The motion was carried unanimously.

The Chairman proposed a vote of thanks to the Secretary, Engineers, and staff, both in London and abroad, remarking that it was simply an act of justice towards them, as they were most zealous in their work, and a great deal was due to them for the manner in which the business was conducted.

Mr. Roan seconded the motion, which was heartily agreed to.

The Secretary, acknowledged the compliment on behalf of the whole staff, and observed that, although it was repeated frequently, still it was none the less appreciated.

Mr. R. Hesketh Jones moved a vote of thanks to the Chairman and Directors. He said he thought the shareholders were very pleased indeed to attend the meetings to hear the lucid statements which were always made by the Chairman. Personally he should regret exceedingly if the half-yearly meetings were abandoned. A great deal had been explained that day, and much that could not have been compressed into a report. He did not think it was a question of economizing the Chairman's or their own time, as they only met twice in the year ; and he seriously hoped that the Board would think better of the matter than to propose that the half-yearly meetings should be discontinued.

Mr. Stevens seconded the motion, which was unanimously carried.

The Chairman, in reply, said that, as the Secretary had observed, though accustomed to such votes, they did not appreciate them the less. He could assure Mr. Jones it was not for a moment a thought of his own time or convenience which actuated him to speak about abandoning the half-yearly meetings. The objection having been raised, he would take the sense of the shareholders on the question at the annual meeting.

The proceedings then terminated.

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Since the above meeting was held, the Directors have announced that, in accordance with a resolution passed at a meeting of the Board, a dividend of 10s. per share will be payable on and after the 1st prox. on the paid-up shares of the Company.

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## BORDEAUX GAS COMPANY.

The report of the Directors of this Company which was presented at the last annual general meeting showed the undertaking to be in a very prosperous condition. The working in the twelve months ending June 30 last produced a profit of 1,364,282 frs., out of which a sum of 434,685 frs. was required to meet bond interest and sinking fund ; leaving 929,597 frs. to be disposed of. During the year covered by the report, 23,441,363 cubic metres (828 million cubic feet) of gas were sent from the works ; and produced a sum of 3,666,011 frs. As compared with the preceding year, these figures show an increase of 1,155,265 cubic metres in the production of gas, and of 134,369 frs. in the receipts ; being 5·02 and 3·66 per cent. respectively. The number of meters in use at the end of the financial year was 13,317, representing 166,446 burners, as against 13,008 meters, representing 156,394 burners, at the corresponding period in 1887. Of the 13,317 meters in operation at the end of last June, 535 were the property of consumers ; while the municipal establishments and the Grand Theatre had in use 219 meters. In the suburban districts there were 351 meters in use. There were 4852 burners employed on June 30 last in the public lighting of the city, and 442 in that of the suburban districts. During the twelve months, 3660 yards of new mains were laid in the city, and about 60 yards in the suburbs. A new gasholder, of about 700,000 cubic feet capacity, which was brought into service at the close of 1887, enabled the Company to better utilize their productive plant. The largest demand for gas was on the 24th of December, when 107,344 cubic metres (rather more than 3¾ million cubic feet) of gas were sent from the works. With regard to the disposal of the available profits (929,597 frs.), after deducting 256,480 frs. for interest, the share sinking fund, and statutory reserve, there was left a balance of 673,117 frs., which was further reduced by 67,315 frs. for Directors' fees ; leaving a net balance of 605,805 frs. for distribution among the proprietors. The Directors proposed to allot to the ordinary shareholders 390,000 frs. ; and to the holders of founders' shares one-third this amount, or 130,000 frs. —leaving 85,805 frs. to be carried forward. This was equal to a dividend

of 90 frs. per share (500 frs.); being an increase of 5 frs. on that of the preceding year. The proposition was agreed to. The addition to the reserve fund brought it up to 405,444 frs., or 105,444 frs. in excess of one-tenth of the ordinary capital of the Company.

## BRISTOL UNITED GASLIGHT COMPANY.

### Dissension among the Directors.

Some correspondence which has recently taken place between the Secretary of the Bristol United Gaslight Company and Mr. R. W. Giles, one of the Directors, has been communicated to the local press; and as something more is likely to be heard of the matter, at all events at the next half-yearly meeting, if not before, we take an early opportunity of placing the letters before our readers. The first letter is from Mr. Green, dated the 15th inst., in which he says that he is directed by the Board of the Company to hand Mr. Giles a copy of a resolution passed by them at their meeting that day; and, in doing so, several members desired him to convey the expression of their extreme regret that it had been found necessary to take this course. The resolution referred to is as follows:—"Resolved unanimously, that in the opinion of this Board, Mr. Giles's conduct has been so marked by want of respect to the chair, by disagreement with his colleagues at large, and by a determined resistance to accepting the decisions of almost unanimous majorities, that they (his co-Directors) find the business of the Company cannot, without extreme difficulty, be carried on under such conditions; and in consequence they regret to have to request him to vacate his seat as a Director." Replying to this letter, Mr. Giles wrote: "I have to remind the Board that their request was anticipated when I informed them orally, on Dec. 18, that I should place my resignation in the hands of the proprietors at the next half-yearly meeting, unless in the meantime the late Chairman, Mr. Colthurst, should have been induced to retire from the Board. If the Board have forgotten the circumstance, I refer them to my letter dated the 12th inst., which I yesterday handed to the Deputy-Chairman, occupying the chair which Mr. Colthurst has relinquished, and in which I inferentially alluded to this intention in connection with my determination to withdraw myself from the meetings of the Board in the interval. The Board have been pleased to accuse me in their resolution of a 'marked want of respect to the chair,' which I deny. The Chairman has pursued a policy of 'marked' discourtesy towards me since March last, which must have been apparent to every member of the Board who has regularly attended its meetings. On Oct. 9 he made an unprovoked attack upon me in the Board Room, which the Board have unanimously pronounced to be without foundation, although I myself deprecated the passing of any resolution upon the subject. The Board know that I have suffered the Chairman's persecution for months in silence. They cannot have forgotten that, on the same Oct. 9, the Chairman's conduct to me constituted such a flagrant abuse of the duties of the chair that although, as usual, I refrained from making any remonstrance, two Directors (viz., the Deputy-Chairman and the Rev. P. R. Sleeman) interposed, and rebuked him with considerable warmth; but even this failed to elicit an expression of regret or apology. I shall not depart from my expressed intention to resign my seat upon the Board, where the unconcealed ill-will of the Chairman has made it impossible for me to discharge the duties I was elected to perform with satisfaction to myself or with advantage to the Company; but I shall not be coerced into placing my resignation in the hands of the Board, from whom I did not receive my trust, but who, on the contrary, resorted to every device to prevent the proprietors from exercising their statutory right of electing me. I believe that my election in September, 1887, is the only instance in the history of the Company in which the proprietors have had any real choice in the election of their representatives, although, it is the obvious intention of the statute law to vest this power in their hands. The Board of the Bristol Gas Company has been self-elected from time immemorial, and is, in consequence, 'out of touch' with the proprietors; and the abuses which have made the Company notorious throughout the country for inefficient management are largely, if indirectly, due to this cause. I content myself for the present with simply denying the other imputations appended to the resolution of the Board, until I can invite the opinion of the proprietors upon them with fuller information of the facts."

## WIDNES LOCAL BOARD GAS SUPPLY.

### The Dinsmore Gas Process.

At the last Monthly Meeting of the Widnes Local Board, the minutes presented by the Gas Committee showed that the illuminating power of the gas supplied during December averaged 18·21 candles. It was also reported that, on the 6th ult., a letter was received from the Dinsmore Gas Company, stating that their patents were completed, and that they were prepared to assign them to the Board in accordance with the agreement; and instructions had been given to have the assignment completed. Mr. Gaskell, in moving the confirmation of the minutes, said (in regard to this latter matter) the letter from the Dinsmore Company stated that they were prepared to assign the patents over to the Board, in accordance with the agreement; but the word "assign" was hardly a proper one to use. What was really meant was that, owing to the way in which they had worked at the process, the Company were willing to grant them the use of the patent free of licence or royalty. This was perfectly satisfactory; therefore they had accepted it. As they now had the process in good working order, it might be as well for him to explain what the results were so far. The Engineer—Mr. Isaac Carr—had referred to them in his report (*ante*, p. 66); but there were one or two other figures which he should like to place before the Board. They had had the process in operation for five months, working with one bed of six single retorts, and one secondary retort or "duct," in which the decomposition of the tar took place. During the month, from Nov. 29 to Dec. 30 inclusive, the results were as follows:—Coal carbonized, 56 tons 17 cwt.; gas made, 1,081,000 cubic feet; gas made per ton of coal, 12,446 cubic feet; average illuminating power, 21·27 candles; estimated quantity of tar used, 783 gallons; quantity of tar used per ton of coal carbonized, 9 gallons. The permanency of the gas obtained by this process was equal to that of ordinary gas. The price of the tar was 25s. per ton, or 1½d. per gallon; and the Arley Mine nuts cost 8s. 1d. per ton. Therefore the total cost of 1 ton of Arley nuts carbonized together with 9 gallons of tar was 9s. 2½d. These results were very striking, both in regard to the quantity of gas produced and its illuminating power. From ordinary coal they obtained about 10,000 feet of gas per ton; and the illuminating power, by a mixture of coal and cannel, would be equal to 17 candles, as compared with 21·27 candles obtained by the Dinsmore process, without the use of cannel coal. If they had obtained those results in the ordinary way by means of cannel, it would have cost them a very considerable sum more than it cost them by the decomposition of tar. Moss Hall nuts cost 8s. 1d. per ton, and 9 gallons of oil 1s. 1½d.—making a total of 9s. 2½d.; but if they had made such a quality of gas from cannel, it would have cost them something like double the amount. So that, from a monetary point of view, the results were extremely satisfactory; and as they had been obtained from a long period of working, he thought they might be absolutely relied upon. When he mentioned the matter some five months ago, they were working under considerable difficulties. They found that the pipes were very frequently choked up with decomposed carbon, which caused delay in the working. These interruptions were, however, now entirely avoided; and the process was working very satisfactorily—requiring no more supervision, and was subject to no more stoppages, than the ordinary processes. The motion was seconded by Mr. Wright, and carried.

## LEEDS CORPORATION GAS SUPPLY.

### Gas-Meter Testing—The Quality of the Gas.

In his annual report, Mr. C. Buckley, the Gas Inspector of the Justices of the Peace of Leeds, states that during the past year there have been tested 10,431 meters, of which 9788 were found correct and stamped, and 643 were rejected; giving a percentage of meters rejected of 6·16. The testing-fees amounted to £339 6s. 11d. This shows an increase for the year in the number of meters tested of 1573; a decrease in the percentage of meters rejected of 1·26; and an increase in fees of £26 9s. During the six months ending June, he tested the gas at York Street 42 times; at Meadow Lane, 43; at Wortley, 42; and at Dewsbury Road, 153 times. The average illuminating power for the six months was: At York Street, 17·23 candles; Meadow Lane, 17·15; Wortley, 16·76—giving an average of 17·04 candles at the works. The foregoing tests were made with a 15-hole burner. On the 1st of July, Mr. Buckley was instructed to use a 24-hole burner; the standard of illuminating power being raised to 19 candles. In the second half of the year, he tested the gas at Quarry Hill 37 times; at Sheepscar, 40; Kirkstall Road, 42; Wortley, 38; and Dewsbury Road, 96 times. The average illuminating power was: At Quarry Hill, 18·67 candles; Sheepscar, 18·43; Kirkstall Road, 19·07; Wortley, 19·09; Dewsbury Road, 18·48—the general average for the six months being 18·75 candles. The illuminating power, Mr. Buckley states, has been well kept up at Quarry Hill for the past three months. At Wortley and Kirkstall Road for the six months it has been over 19 candles. At Sheepscar and Dewsbury Road, it has been seldom up to the standard, and very often much below it. The lowest point reached was at Sheepscar, on Nov. 13, when it was 17·08 candles. The total number of tests made during the year was 586.

## THE PROPOSED PURCHASE OF THE BRIERLEY HILL GAS-WORKS BY THE LOCAL BOARD.

At the last Meeting of the Brierley Hill Local Board—Mr. B. Freeth presiding,

The Clerk reported that, in accordance with instructions given him at a previous meeting,* he had written to a large number of public bodies in the country, asking (1) if they had built or purchased gas-works; (2) if so, had the working been profitable or not; (3) had the acquisition of the works been a means of reducing the rates; (4) had the consumers been supplied with better gas; and (5) had the price of gas been reduced? The following Boards replied that they had acquired the gas-works:—Maryport, Burnley, Burton-on-Trent, Birstal, Lytham, and Dalton-in-Furness. In each case, except that of Birstal, it was stated that the works had been profitably transferred, and that better gas had been obtained at a cheaper rate. The Clerk to the Birstal Local Board said that the works had been purchased at a loss; but better gas had been supplied, and the price reduced from 4s. to 3s. 3d. per 1000 cubic feet.

Mr. Skidmore said that the replies they had received to their enquiries were generally favourable to the policy of local authorities acquiring gas-works. They were told that the works at Burton-on-Trent were profitable. Birstal said there was a "loss, but rates reduced from 4s. to 3s. 3d." How they could call that a loss, he could not understand. At Burnley the concern was "profitable, with gas reduced from 3s. 6d. to 2s. 6d. per 1000 feet." At Maryport the price of gas had been reduced from 4s. 2d. to 3s. per 1000 feet. The purchase of the gas-works by Brierley Hill appeared, *primâ facie*, a large and gigantic undertaking, and one which required much consideration. The Brierley Hill Gas Company's Acts (1849 and 1865) were considered old and antiquated now, and quite unsuitable to the onward progress of the town. Their very age presented a most important reason why they should be supplanted by something more modern, and better suited to existing requirements. He had not the slightest hesitation in characterizing the Company's Acts as a cruel monopoly, which they had enjoyed much too long for the good of the town. It was no use ignoring the fact that were the weal and welfare of a town at stake, monopolies of this kind must cease to exist in its midst. The original or "A" shares of the Company were now paying 10 per cent. dividends. The amount of capital on which this enormous percentage was now being paid was £11,750; and for the use of this money alone, £1180 was absorbed every year out of the profits on the sale of gas. This £1180 alone would nearly pay one-half of the annual amount which would be required by the Board to pay off capital and interest combined on the loan of purchase, calculated at 50 years. In considering this question of the purchase of the Company's property, four important integers stood out in bold relief—First, a permanent reduction in the rates of the town; second, a much cheaper price to the consumers of gas; third, a better quality of gas; and, fourth, it might be, the public lighting for nothing. In regard to the illuminating power of the gas now supplied, he was surprised to find out that it was below the standard of any other Company in Staffordshire—viz., 13 candles only. Whenever this question had cropped up, the Company always pointed to an enormous loss by leakage of gas from mining operations, the disturbance of the pipes, &c.; and doubtless the same argument would be raised again with the same degree of force, and the Company might tell them that 15 per cent. of the gas was lost by leakage. But their complaint on this score was now getting old and flat, and must to a certain extent collapse. His (the speaker's) mining experience in the Company's area, enabled him to say that the future had not much to dread on that score, beyond the ordinary leakage due to the natural escape of gas from the mains and other unforeseen circumstances, which were bound to happen with the best regulated companies. According to the returns of the Company for 1886, they were paying about £2283 in dividends, and earning £3333 as gross profits; so that by deducting one from the other, it would appear they had £1050 of surplus profit for a sinking fund. In the hands of the Board it could easily be imagined that the works would soon prove to be a very valuable property, especially when the increase which had been going on yearly, and which would still go on—viz., 4·30 per cent.—was taken into consideration. In 1880, the coals carbonized amounted to 5022 tons; and the quantity of gas sold was 37,427,100 cubic feet. The figures for subsequent years were: 1881, 4823 tons and 37,137,700 cubic feet; 1882, 5324 tons and 41,341,800 cubic feet; 1883, 5762 tons and 44,925,200 cubic feet; 1884, 5839 tons and 45,960,400 cubic feet; 1885, 5133 tons and 46,323,500 cubic feet; 1886, 5292 tons and 48,302,000 cubic feet; 1887, 5522 tons and 50,398,306 cubic feet. He wished the increase for 1887 to be particularly noted. With an increase of 230 tons of coal, 2,086,306 cubic feet extra of gas was sold. He contended that the works were capable of yielding, as a moderate profit,

* See Journal, Vol. LII., p. 1081.

12s. per ton on all the coal carbonized. The last year for which returns were issued (1887) the Company, upon the usual increase of 4·30 per cent. of gas sold, must have carbonized 5522 tons of coal; and this, at 12s. per ton, should or might have yielded £3313 as a gross profit, whilst the Company only earned £2672 15s. Why was it that this £3313 was not earned; and, if earned, how and in what manner was it disposed of? There were other gas-works in Staffordshire where more than 12s. per ton profit was easily made. At Burslem, the price of gas was 3s. 2d. and 3s. per 1000 cubic feet; and the gross profits per ton were 15s. 9d. At Stafford, the price was 3s. and 2s. 10d.; and the gross profits, 12s. 6d. At Longton, the price was 3s.; and the gross profits, 12s. 3d. At Burton-on-Trent, the price was 2s. 10d.; and the gross profits, 13s. 1d. The average gross profit in the foregoing cases was 13s. 4d.; and as he had set down as the basis of his calculations 12s. per ton only, this showed an under-estimation of 1s. 4d. per ton for Brierley Hill. In 1887, the gross profit of the Company was £2672 15s., or a profit per ton on the coal carbonized of 9s. 8d. only. This showed a difference in gross profits between the Company and himself of £740, and he would leave the Company to reconcile the difference if they could. As to the future aspect of the case, upon the same ratio of increase which had obtained in the past, they might safely assume that the coal carbonized, sale of gas, and increase of profits would in the future be as follows:—

| Year. | Tons of Coal. | Cubic Feet Sold. | Gross Profits. |
|---|---|---|---|
| 1888 | 5,761 | 52,585,592 | £3,457 |
| 1889 | 6,012 | 54,867,806 | 3,607 |
| 1890 | 6,272 | 57,449,068 | 3,763 |
| 1891 | 6,545 | 59,783,677 | 3,927 |
| 1892 | 6,829 | 62,326,118 | 4,097 |
| 1893 | 7,125 | 65,031,071 | 4,275 |
| 1894 | 7,437 | 67,853,419 | 4,460 |

These figures gave an average of gross profits for the next seven years, based on the results of the past, of £3932. In regard to the economy and the benefit to be derived by the town by the purchase, he thought he had already shown conclusively that they would be enormous. The transfer of the works would enable the Board (1) to reduce the price of gas; (2) to materially lessen the dead weight of unredeemed capital in its effects upon the cost of gas; (3) to abolish progressively all meter-rents; (4) to supply better gas; (5) to increase the illuminating power of the gas; and (6) to apply surplus profits to the relief of rates. As to the economical side of the question, and to further demonstrate the clear profits derivable to the town by having the gas undertaking in its own hands, he could not do better than refer to precedents and examples. He might first of all ask why it was that at Plymouth gas sold at 1s. 10d. per 1000 cubic feet, and in Brierley Hill at 3s. 6d. up to 10,000 cubic feet. At Nottingham the charge was 2s. 2d. per 1000 cubic feet, with £16,732 of profits. The Birmingham Corporation charged 2s. 5d. and 2s. 1d.; realizing profits perfectly astounding. The price was 2s. 6d. at Bradford, with a profit of £18,289. The Manchester Corporation charged 2s. 8d., with £34,000 of profits. In Leicester gas was sold at 2s. 8d.; and the net profits, after paying interest on all the borrowed capital, amounted last year to £29,763 19s. Lastly, the town of Belfast, in Ireland, purchased the gas-works in 1874; and the Secretary said that they had been exceedingly prosperous. The average price of gas was only 2s. 9d. per 1000 feet, with no meter-rents; and they were now making a yearly surplus profit of £20,000, besides being in a better position to meet competition than they were in 1874 by 1s. 9d. in the selling price, and by 8d. per 1000 feet in the cost of production. He wished to say, before proceeding further, that he was, of course, in favour of giving the Company a reasonable compensation over and above the amount of their paid-up capital. The loans and capital of the Company now stood at £31,263. The Board could obtain a loan for this amount, extending over a term of 50 years, for repayment of capital and interest combined, for an annual payment of £1337. The income derivable to meet this yearly payment would be as follows:—By surplus of net profits, £270 7s.; the dividends, as now being paid, £2211; interest on Company's loan of £3000, £135; Directors' fees saved, £300; Auditor's fee saved, £42; probable saving effected in collection of accounts, £50—total, £3008. Deducting repayment of principal and interest combined, £1337, they would have left £1671 available to be applied in reduction of the price of gas and the rates. In 1887, the Company carbonized 5222 tons of coal, which, at 12s. per ton, should have brought a profit of £3313; and after deducting the total amount paid as dividends, £1101 10s. 8d. should have been left as profit, to which should be added the saving to be effected in Directors' fees, &c., and this gave the following results:—Surplus profits, £1101; interest on loan, £135; Directors' and Auditor's fees, £342; probable saving in the collection of accounts, £50—total profit £1628. Now, the first case was assumed, but the second was real, and ought to have been achieved; and the difference both ways was only £43. He had considered this question for years; and he had come to the conclusion that if the Board purchased the gas-works it would net more than £1000 a year as profits, to go into the pockets of the ratepayers. A penny per 1000 cubic feet on the price of gas meant £219; so that a reduction of 3d. per 1000 cubic feet all round would mean £657. As a beginning he would propose to sacrifice this £657; and this step would diminish the gas profits of 1888 from £3457 to £2800. In conclusion, he wished to impress upon the members of the Board the fact that the proposed purchase would not incur a liability beyond £2800 per annum for interest on loan of purchase, floating capital, together with all working expenses. It was bound to pay; yield perfectly satisfactory and profitable results; and would prove an absolutely safe and sound investment, and that after reducing the price all round by 3d. per 1000 cubic feet. He moved—"That a Committee be appointed to take into consideration the advisability or otherwise of purchasing the gas-works, and report to the Board thereon."

Mr. WALDRON seconded the resolution. He thought the purchase of the gas-works was a question of very great moment to the town. Should the Board decide to purchase the works, of course, compensation would be made to the shareholders in the Company; and he was pleased to see Mr. Skidmore had referred to this.

The resolution was carried; and a Committee was afterwards appointed.

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CHELTENHAM WATER SUPPLY.—The Water-Works Committee of the Cheltenham Corporation issued their annual accounts this week, from which it appears that the income derived from the water-rates during the past twelve months amounted to rather more than £14,000. The expenditure included £12,000 paid on loans and annuities; salaries, £814; rates, taxes, &c., £985; wages and materials, £560; and the cost of the opposition to the Liverpool Water Bill, £646. The water-works capital account shows that the total amount spent up to the present time is £305,000. During last year the loan liabilities were increased by nearly £10,000, of which sum £6531 was raised for the extension and purchase of works at Tewkesbury.

## BINGLEY IMPROVEMENT COMMISSIONERS GAS SUPPLY.

### THE COST OF GAS MANUFACTURE.

We have been favoured by Mr. G. Dunbar Malam, the Engineer of the Bingley Improvement Commissioners Gas Undertaking, with some statistics in regard to the working, which shows that, by close attention to Sir Frederick Bramwell's "next-to-nothings," he has been able materially to reduce the cost of manufacture during the past few years. Wages for stoking, coaling, and purifying cost per 1000 cubic feet of gas produced in 1888, 2·39d.; in 1887, 2·31d.; and in 1875, 5·45d.—showing a reduction under this head between the first and last named years of 3·06d., and representing a saving on the amount of gas manufactured in 1888 of £729 6s. 6d. The quantity of gas produced in 1888 was 57,202,300 cubic feet; and in 1887, 52,143,300 feet—or an increase for the past year of 5,059,000 cubic feet. The gas manufactured has increased four-fold during the past two decades; the figures for 1868 being 14,607,100 cubic feet. In 1875 the leakage stood at 12·99 per cent.; and this has gradually been reduced to 4·68 per cent. in 1888—being a decrease of 8·31 per cent. The monetary value of this reduced leakage for the past twelve months (4,753,511 cubic feet, at 2s. 6d. per 1000 feet), compared with the loss in 1875, is £594 2s. This saving in leakage, with that mentioned above under the head of wages, represents £1323 8s. 6d. The capital employed per million cubic feet of gas manufactured in 1875 was £1268; and last year it was £577—being a decrease of £691 in the thirteen years. The loan capital in 1875 stood at £40,980; and in 1888 at £33,012—being a decrease of capital of £7968, and this with the storeage accommodation augmented 100 per cent., the purifying power, 300 per cent., and the distribution plant about doubled. The average price of gas in 1875 was 4s. 9d.; and at the present time it is 2s. 5½d.

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## WALSALL CORPORATION GAS SUPPLY.

### DIFFERENTIAL PRICES FOR GAS.

At the Monthly Meeting of the Walsall Town Council yesterday week, Mr. H. Sanders, in pursuance of notice, moved that an equal price be charged to all consumers of gas, instead of the present differential rates. He argued at some length that the extra charge of 6d. per 1000 cubic feet to consumers in the outlying districts, and also the different charges to large and small consumers, were unfair. The gas-works were being carried on for the benefit of large consumers and owners of factories, who obtained gas from the Council at 2s. 1d. per 1000 feet, and charged their workpeople a much higher rate for it. It was not fair to charge a small consumer 2s. 5d. per 1000 feet, and a large consumer 2s. 1d.; and the Council should not only put an end to differential charges, but dispense with collectors, and allow a discount to persons paying at the office. He pointed to Leeds and other places in support of his contention in favour of uniformity of prices. It might be said that the Council were obliged by their last Act to charge 6d. per 1000 feet extra to outside consumers; but they might get over that by giving back the 6d. in discount. Mr. Baker, on the condition (which was agreed to) that Mr. Sanders would alter his motion so that the matter should be referred to the Gas Committee, seconded the motion; but he went on to show that Mr. Sanders's contentions were evidently based on wrong grounds, and that the present charges were equitable as being as near as possible to the cost of production and distribution. The Mayor (Mr. S. Russell), who is Chairman of the Gas Committee, said that the present charges of 2s. 5d., 2s. 3d., and 2s. 1d. were rather favourable than otherwise to the small consumers. Of those who paid the first, there were 5120; of the second, 800; and of the last, 86. He also pointed out that the consumers who were charged the latter price paid, on an average, £14 a quarter each; while two of the small consumers only averaged 10s. He contended that the difference in cost did not pay for the extra labour of inspection and collection of money. With regard to the price of gas at Leeds, Mr. Sanders had forgotten to tell them that meter-rent was charged there, which came to about £10,000 a year, and that, in addition, the Corporation made a loss last year of £11,000, and had an accumulated deficiency of £30,000. With regard to the extra 6d., he had himself thought that it was time this was done away with; and for some months it had been under consideration. He feared, however, it could only be accomplished by Act of Parliament. He moved, as an amendment—"That the General Purposes Committee be requested to consider and to report as to the expediency of the Council applying to Parliament for a local Act to enable the Town Council, among other things, to abolish the additional charge of 6d. per 1000 feet now paid for gas supplied to the outlying districts." Mr. Powell seconded the amendment, which was carried, with only Mr. Sanders in opposition.

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## STALYBRIDGE CORPORATION GAS SUPPLY.

### QUALITY OF THE GAS—THE COAL CONTRACTS.

At the last Meeting of the Stalybridge Town Council—the MAYOR (Alderman J. Ridyard) presiding—the matters named above were alluded to on the presentation of the Gas Committee's minutes.

Mr. THORPE called attention to the many complaints which had been made with respect to the quality of the gas. Such complaints had been renewed for several years; and this was not the first nor the second time that he had brought the subject before the Council. No improvement seemed to take place. Two years ago it was said they were short of gas-holders. At that time the gas went out and the town was left very nearly in total darkness; and some of the mills had to stop work in the afternoon. A new gasholder was erected; and it was naturally supposed the evil had been cured, and that there would be sufficient gas for the supply of the wants of the borough. Last winter, however, when there were two or three days of fog, the gas went out in a similar way; and the mills had again to stop in the afternoon. A similar state of things would have occurred a few days ago, had not the fog cleared away on the second day. Had there been three days' fog, the town would have been in darkness. On both days on which the fog prevailed, some of the hands at the mills in the town stopped their machinery, and went to the managers to see if they could have matters improved. But the pressure was on full at the meters; and the managers of the mills could do nothing. The fact was, the quality of the gas was simply wretched. The Gas Committee knew all about the difficulty; but they had not done anything since last winter to make up for the deficiencies at the works. Where the fault lay, he did not know. Whether they were deficient in purifiers, or whether it was bad coal or bad management, he could not tell; but he certainly thought the fault should be remedied, and that people should have value for their money.

Mr. HOPWOOD believed there was no town which, on the average of the year, had a better supply of gas than Stalybridge. It surprised him to hear these continual complaints as to want of holders. It was perhaps better to risk closing the mills for an hour or two a year, than to spend £12,000 or £13,000 on a new holder. In regard to the coal contracts, he wished to ask, supposing that the contractor for the gas-works failed to get a supply of the coal bargained for, was he at liberty to get it where he liked?

The MAYOR said that he went to the gas-works very frequently; and he never returned without testing the gas himself. The general result

was that it was of 20-candle power; while their Act of Parliament only bound them to deliver gas of 16 candles. A complaint came from one mill, and was investigated by the Manager, who went to the place, tested the gas, and found it was of 19½-candle power; and the manager of the mill would not say that it was ever any worse than that. As to the shortness of the supply when the Manager reduced the pressure to 1 inch, he had 300,000 feet in stock. An hour afterwards there was bright sunshine; and the day was clear.

Alderman ATKINSON said the Corporation were short of storeage accommodation for the gas. If they were prepared to spend £10,000 or £12,000 on a new holder, he was willing; but he did not think they were quite ready for it yet. Mr. Thorpe asserted that if they had had two or three foggy days last week, they would have been in a similar difficulty to that in which they were placed last year. He (Alderman Atkinson) absolutely denied this. The Manager was carefully watching the state of things. They would have to spend some money by-and-bye; and he hoped the condition of the town would soon require it. Last year they had two or three foggy days; but the circumstances to which Mr. Thorpe referred were exceptional. As to the inferior illuminating power, he doubted whether it had been as bad as was represented. He had heard complaints certainly, but they had only had one from a mill-owner. With regard to Mr. Hopwood's question, he scarcely understood what he meant.

Mr. HOPWOOD said that what he wished to know was whether, if their contractor could not obtain the particular coal contracted for, he was at liberty to get coal elsewhere.

Alderman ATKINSON: Certainly; he can get coal where he likes, if it is of equal quality.

The MAYOR: I think all our tenders are for a certain main and a certain pit. There is no tender let to any agent except for coal from one pit.

Mr. THORPE: I believe you have sent some back.

The MAYOR replied in the affirmative.

The minutes were then passed.

## THE ELECTRIC LIGHTING EXPERIMENT AT LEAMINGTON.

### THE CONTRACT TO BE DETERMINED.

At the Meeting of the Leamington Town Council on Monday last week—the MAYOR (Alderman Flavel) presiding—the General Purposes Committee reported that they had received a letter from the Midland Electric Light and Power Company, giving the cost of lighting the Parade by different systems. The letter was as follows:—"First system: We would suggest twenty arc lamps, giving a total of 40,000-candle power, as against 3000-candle power at present. These to be turned off in two equal lots, as in the present system, and for the present hours. We to provide and maintain everything for the sum of £42 each lamp per annum. The above system involves permission to erect and maintain posts for overhead wires. Second system: We would suggest thirty 300-candle power "Sunbeam" lamps in globes with suitable reflectors, giving a total of 9000-candle power, as against 3000-candle power at present. These to be turned off in two equal lots, as in the present system, and for the present hours. We to provide and maintain everything for the sum of £30 each lamp per annum. Third system: To remove every lamp-post and put two 25-candle power lamps in the remaining ones; making the same number of lamps, and giving a total of 4500-candle power as against 3000-candle power at present. These to be turned off in two equal lots, as at present, and for the present hours. We to provide and maintain everything for the sum of £600 per annum. All the above to be subject to a three years' agreement. We may mention in conclusion that in some towns the lamps are not run after 12 p.m. This considerably reduces the cost; in fact, it may be taken that the amount will vary in proportion to the number of hours used." The Committee recommended that, as the terms were too costly to be entertained, notice should be given to terminate the contract twelve months hence.

Mr. FELL, in moving the adoption of the Committee's report, said he regretted that the Electric Light Company should not have seen their way to deal more generously with the Council. The resolution to recommend the Council to give notice to terminate the agreement was unanimously adopted by the Committee; and they believed that the prices which the Company asked for either of the lights were altogether out of proportion to the value of the light. It was the opinion of the Committee that the arc light was thoroughly inefficient; and as compared with other towns, it was a miserable failure. With regard to the incandescent light, he thought it did not give anything like the stipulated quantity of illumination; and as the ratepayers ought to have the light promised them, he suggested that this should be attended to by the Clerk and the Surveyor during the time the notice had to run. He repeated that he moved this resolution with regret, because he had expected great things from the electric light; and he believed the results would have been more satisfactory with ordinary care and attention.

Mr. BRIGHT seconded the motion. He expressed his disappointment with the treatment that the Council had received from the Electric Light Company. It was not at all likely that the Council were going to give such an excessive price as the Company demanded. With reference to the part of the report which recommended that notice be given the Company to terminate the agreement, he cordially agreed. In the first instance he supported the introduction of the electric light; and he then supposed that they were going to be supplied with a light which would be satisfactory to the town, and better than gaslight. The electric light they had was inferior to gas; and he thought this was owing to the Company not having a resident representative to see for himself what was going on. The Council must take care during the next twelve months that they obtained a decent, if not a good, light; and such as they had a right to demand. The Company were bound to renew the lanterns when required; and the Surveyor should enforce renewals. None of the lamps had been kept clean, and the lights had largely deteriorated. The Company had lost an excellent opportunity through their utter obstinacy and disregard of the wishes of the town.

Alderman GILBERT observed that the arc lights were sometimes throwing a blinding light on the ground immediately under the lamp, and were continually popping in and out. This might lead to an accident by frightening a passing horse; and supposing an accident occurred in that way, he should like to know who would be responsible—the Electric Lighting Company or the Corporation?

The TOWN CLERK replied that, in his opinion, the Company would be responsible.

Mr. HARVEY thought that, in giving notice to determine the contract, the Council were acting in accordance with the wishes of the whole town. He regretted having under pressure withdrawn a similar notice of motion which he placed on the *agenda* a year ago. He had always entertained the opinion that low-power incandescent lamps were not adapted to the purposes of street lighting. The light had been very defective; and some improvement should be made during the current year.

The MAYOR said he was sorry that circumstances had arisen which almost compelled the Council to terminate the contract. The greatest forbearance had been shown to the Company, who had only themselves to blame for the present result. The town had had very little but experiment; and certainly very little that could be called satisfactory in the way of an illuminant on the Parade.

The resolution was carried unanimously.

The CLERK intimated that he would at once give the Company a year's notice to determine the agreement, and call upon them to cease the experiments with the arc and "Sunbeam" lamps, and return to the old system of 16-candle power incandescent lamps.

The question of the lighting of the Parade was again discussed on the presentation of the Finance Committee's report; that body having declined to recommend the payment of the Company's claim of £96 for one quarter's lighting of the Parade, upon the ground that the light had been so defective that they did not consider the ratepayers had received what the Company had contracted to give. It was explained that, under the contract, the Corporation were bound to pay or refer disputes to arbitration. A member of the Committee stated that they had referred the quarterly claim to the whole Council, in order that Messrs. Chamberlain and Hookham might know how thoroughly dissatisfied they were. The amount was ordered to be paid.

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It will be recollected that the Leamington Corporation gave Messrs. Chamberlain and Hookham permission to lay their wires in the borough without requiring them to obtain a Provisional Order. Mr. Chamberlain promised to do his best to get the installation ready for the Jubilee celebration. The work was not, however, complete until November, 1887. The Corporation paid for the standards and lamps, the number of which was double that used for lighting the same area by gas, and also agreed to pay Messrs. Chamberlain and Hookham about £400 per annum for lighting the main thoroughfare. This sum was double that paid to the Gas Company for lighting the area. Two months ago Messrs. Chamberlain and Hookham initiated experiments with 36-candle power incandescent lamps, the "Sunbeam," and the arc systems. The last-named, though the cheapest, was dismissed owing to the flickering and unreliable nature of the light. Nothing is said against the "Sunbeam" lamp but its expense, as it would entail an annual outlay of £900 for lighting the principal streets in the borough. The Gas Company offer to light the same area with Sugg's "Whitehall" lamps for £300 per annum.

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THE GAS AND WATER COMMITTEE OF THE CITY CORPORATION.—At the meeting of the Court of Common Council last Friday, the Committees for the ensuing year were appointed. Mr. Morton moved a resolution to abolish the Gas and Water Committee, and to transfer the outstanding references to the Local Government and Taxation Committee. In justification of his motion, he said the Committee had "nothing to do, and took a deal of time to do it." Mr. Stapley seconded the proposal, which, however, was negatived, and the Committee was re-appointed.

ELECTRIC LIGHTING AT READING.—It will be remembered that some two or three months ago, Messrs. Laing, Wharton, and Down obtained the sanction of the Reading Town Council to an experiment with arc lights in the main thoroughfares. That the firm are confident of doing business in the town, is shown by the fact that they are putting down a costly and permanent plant on a site on what is known as "the Island," which has been acquired by them. In the boiler-shed, provision has been made for two 25-horse power boilers, one of which is already *in situ*. Twin Armington-Sims engines, of 9-horse power nominal, have been laid down to drive the dynamos. The dynamos (also in duplicate) are of the Thomson-Houston type; and these are each capable of running twenty 1200-candle power arc lamps. Thomson-Houston lamps will be employed for indoor purposes; and Thomson-Rice lamps for outdoor use. It is said that many of the business firms in Reading contemplate adopting the light, if they see the practicability of doing so demonstrated.

THE WATER SUPPLY OF LONG EATON, STAPLEFORD, AND SANDIACRE.—A meeting of the Stapleford Ratepayers' Association was held last Wednesday last, to consider the proposals of the Company, who are making application to Parliament for powers to supply water to the districts mentioned above. The Engineer of the Company (Mr. W. H. Radford) explained that it was intended to sink two wells, one in Stapleford and another in Sandiacre, with a service reservoir at the latter place. The Company only wanted a profit of about 5 per cent. on a probable outlay of £14,000. The shares would be first offered to the consumers; and no one would be compelled to take the water, which would be of excellent quality. It was decided not to oppose the scheme. A meeting of the ratepayers of Long Eaton has also been held, at which the following resolution was passed:—"That the Long Eaton Local Board are hereby authorized and requested to oppose the application intended to be made to Parliament for leave to bring in a Bill for an Act to incorporate a Company, and to authorize a Company to supply water for all purposes within the parishes and townships of Long Eaton, Sandiacre, and Stapleford, in the counties of Derby and Nottingham, or some of them, or some part or parts thereof respectively." In the course of the discussion which took place on the matter, it was stated that the Local Board are formulating a scheme for the water supply of the district.

ELECTRIC LIGHTING AT SWANSEA.—At the meeting of the Swansea Harbour Trustees yesterday week, the Executive Committee, in their report, recommended that £2000 be expended in adopting the electric light, in lieu of gas, as an illuminant of all the docks, the warehouses, sheds, and offices of the Trust. In moving the adoption of the report, the Chairman (Mr. G. B. Strick) remarked that it had been long felt that the docks were not sufficiently lighted. They had the Prince of Wales Dock lighted by electricity now, and it was thought advisable to see if the other docks could not, without a large expenditure, be similarly illuminated. Their officials prepared a very exhaustive report; and the Committee, after careful consideration, arrived at the opinion that for £2000, exclusive of the engine they had now in stock, they would be able to efficiently light all the docks, their wharves, warehouses, sheds, and offices, and that without increasing their expenditure, as they would save on the payment they now made for gas. He thought, from the figures placed before them, they would have value for the outlay. The recommendation was adopted. Commenting on this matter, a local paper says:—"On lighting the docks in an inadequate way by gas, £950 was spent by the Harbour Trustees; and now they find that they can by electricity do the work efficiently for £460 a year, which includes interest on the £2000 necessary to procure the plant. The system is the Brush; and the electricity will be generated by means of a 100-horse power engine placed in a central position. The illuminating power will be nearly 60,000 candles; whereas it is estimated that to get a third of that power in gas £1400 a year will be required." A suggestion is afloat that the Harbour Trustees should light Wind Street and other main thoroughfares adjacent to the docks, by means of the surplus power which would be generated for their own purposes. The statement that "on lighting the docks in an inadequate way by gas, £950 was spent," has, since the foregoing was in type, been contradicted by *The Cambrian*, on the authority of the Manager of the Gas Company (Mr. Thornton Andrews), who states that for the year ending Dec. 31 last, the total cost of lighting the whole harbour was £340 16s. 7d.

## METROPOLIS WATER SUPPLY.

The returns furnished to the Registrar-General by the London Water Companies show that the average quantity of water supplied daily to the Metropolis during the past month was 153,616,885 gallons, against 153,157,994 gallons in the corresponding month of 1887. The number of houses served last month was 746,277, or 206 gallons per house, and 26·4 gallons per head of the population. In December, 1887, the number of houses supplied was 733,128; and the quantity of water allowed for each person 26·8 gallons. Of the entire bulk of water supplied last month, 75,789,338 gallons were drawn from the Thames, and 77,827,547 from the Lea and other sources.

In their report to the Official Water Examiner of the Metropolis, Messrs. Crookes, Odling, and Tidy state that during the past month the quality of the water supplied to the Metropolis has continued to be excellent. The quantity of organic matter, although a little larger than that found last month, was not high for the time of the year. Of the 168 samples examined, only two showed the slightest trace of suspended matter; the remaining 166 samples being bright and most efficiently filtered.

In his report to the Registrar-General on the quality of the Metropolitan water supply last month, Dr. E. Frankland remarks: "Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health, was:—Kent, 0·5, Colne Valley and Tottenham, 1·6; New River, 3·7; Chelsea, 4·6; Lambeth, 4·8; Southwark, Grand Junction, and East London, 4·9; and West Middlesex, 6·0. The Thames water sent out by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies again exhibited, in every case, an increased quantity of organic matter. The augmentation was most marked in the West Middlesex Company's water, which contained a considerably larger proportion than I have observed in any Metropolitan water for a long time past. Moreover the organic matter in this, and in the supplies of the Southwark and Grand Junction Companies, was also somewhat highly nitrogenous. All the samples were well filtered. The water chiefly derived from the River Lea, and distributed by the New River and East London Companies exhibited a corresponding increase of organic matter; the actual proportion present in the New River Company's was, however, considerably smaller than in any of the other river supplies. Both samples were clear and bright. The deep-well waters of the Kent and Colne Valley Companies and of the Tottenham Local Board of Health contained, as usual, only a very small proportion of organic matter. The Colne Valley Company's water was softened by treatment with lime before delivery, although the degree of softness produced was less than usual."

## CHELTENHAM CORPORATION WATER SUPPLY.

### A Condemnation of Stand-Pipes.

Last Wednesday, Mr. Arnold Taylor, one of the Inspectors of the Local Government Board, held an inquiry at Cheltenham into an application by the Corporation for an extension of the power given to Rural Sanitary Authorities by sections 7 and 9 of the Public Health (Water) Act, 1878—viz., power to levy a water-rate on the owners or occupiers of properties in the immediate vicinity of stand-pipes. At the outset, the Inspector asked if there were already any stand-pipes in the town; and being answered in the negative, expressed the hope that the Corporation were not going to put up any. The Town Clerk (Mr. Brydges) said such an expression of opinion coming from Mr. Taylor would be valuable to the Town Council. He might mention that the Water Engineer, Mr. W. M'Landsborough, considered it an undesirable thing to erect stand-pipes; but he (the Town Clerk) thought there might be certain circumstances under which it would be advisable to do so. There had recently been a severe outbreak of typhoid fever in the town; and the cause of the outbreak had been principally attributed to the well water supply in certain parts of the town. A good deal of friction had been caused by the action of the Corporation in this matter. They had called upon many owners to lay on the town supply; and while several owners had complied, others had not, contending that their supply from the wells was pure. As a temporary way out of the difficulty, the Corporation had decided to erect stand-pipes in the poor localities; and they now wished to have extended to them the powers conferred upon Rural Sanitary Authorities by sections 7 and 9 of the Public Health Act, in order that they might recover water-rates from the owners or occupiers of houses situated within 200 feet of any stand-pipe, in the same manner as if the water had been laid on to the premises. No rate, however, was recoverable unless the water from the stand-pipes was used by the inmates of the houses. The Inspector said that, under the circumstances, he did not think the stand-pipes would get over the difficulty. In seeking to levy rates, it would seem that they wished to establish the stand-pipe system. After discussion, the Inspector intimated that he would view the localities where it was proposed to erect the stand-pipes.

## THE BOLTON CORPORATION WATER UNDERTAKING.

### The Enlargements and Improvements at the Works—Decreased Water Consumption and Increased Revenue.

According to an interesting account (appearing in a local paper) of the operations conducted during the year just ended by the Committees of the various departments of the Bolton Corporation, the greatest importance attaches to the work carried on in connection with the water-works under the chairmanship of Mr. Alderman Musgrave, J.P., and executed under the superintendence of the Water-Works Engineer, Mr. R. H. Swindlehurst, C.E. One of the main undertakings has been the enlargement and improvement of the reservoir at Entwisle, where at a point nearest to the Wayoh Reservoir, about 72,000 cubic yards of earth have been taken out; thus giving a capacity for 12 million additional gallons of water. About 40,000 cubic yards of earth have yet to be taken out at the top end of the reservoir; and when this work is completed (which will be some time this year, though at present operations are stopped on account of the water being up to the point at which the work was being carried on), about six million gallons more can be stored. The shingling of the slopes on the side of the reservoir nearest to Entwisle township has been completed, and partly finished on the Turton side of the reservoir. Other improvements have been effected; and taking the Entwisle Reservoir altogether, the Committee and the Engineer, as well as the public, have now the gratification of looking upon a reservoir of huge size full of excellent water—no longer having the appearance of a mere pool of muddy water, but really a superb branch of the water-works, with an overflow fall of 80 feet in width. As the water then flows down a waste-water channel, 50 feet in width, and then with a descent of 80 feet, when the surplus water is passing over it, it forms a very grand sight. Retaining walls have been constructed along both sides of the Broadhead Brook—which is the principal source of supply to the Wayoh compensation reservoir—for about 1400 yards on each side of the stream; and cross weirs have also been formed at intervals in the bed of the brook—the object of this work being to purify the water, and to prevent the brook silting up, or the passage of stones or other *débris* into the reservoir. These improvements, which are to be finished about the middle of next month, will prove of great advantage in keeping the reservoir free from sediment and other impurities which have previously passed into it through the brook. The main drift or tunnel to secure the supply from the Horwich Hills, has been driven a length of nearly 1050 yards; and from this source an uninterrupted yield of most excellent water is obtained, which goes into the Heaton Reservoir by a stream. The daily average yield from this source during the past twelve months was 163,000 gallons; but this has now been materially increased. The daily average during December was about 221,000 gallons, though on some days during the month it was as much as 368,000 gallons. A side drift from the main driftway is being constructed (having now progressed for above 200 yards) to keep the strata from polluting the water in the principal drift. Excavation work is being executed as rapidly as possible for the new filtering-beds at Heaton, close to the reservoir. These will be three in number, with a filtering area of about 3600 yards, and capable of filtering more than 2½ million gallons of water per day when all are going. Above 5200 cubic yards of earth have been removed for the new beds. The "Sharples drift," in a place called "Hampson's Pastures," Belmont Hills, and which is connected with the Dingle Reservoir, now yields a daily average supply of about 50,000 gallons. Trial holes have been made on the land at High Rid, intended for the construction of the new reservoir at Heaton, and which will hold from 90 to 100 million gallons. New mains have been carried into the Over Hulton portion of Chequerbent; and Chapeltown, in Turton, is now supplied with water from the Edgworth Reservoir at Crowthorn—thus conferring a great advantage upon that portion of the district. As to the stock of water in all the reservoirs, it may be mentioned that it now amounts to the enormous quantity of 980 million gallons; being within about 40 millions of the maximum quantity for which there is storeage capacity—viz., 1020 million gallons. There have been only two years since 1879 when the supply in store has exceeded the quantity now available. The total available volume of water in store at the end of December, 1887, was only about 268 million gallons. It may be added that while the yearly revenue derived from the water-works during the past corporate financial year was £8000 more than in 1881, there is now a diminution in the average daily consumption throughout the area of supply of more than 1½ million gallons per day, as compared with this time last year. Altogether it may be confidently stated, says our contemporary, that our gigantic water-works were never in better order, the supply more abundant, or the general undertaking in a more satisfactory state.

## COVENTRY CORPORATION WATER SUPPLY.

### The Proposed New Works.

A Special Meeting of the Coventry City Council was held last Tuesday—the Mayor (Mr. Alderman Tomson) presiding—when the principal business before the members was the consideration of the Bill authorizing the new water supply scheme. The powers sought for in the proposed Bill were referred to, under our "Parliamentary Intelligence," in the JOURNAL for the 4th ult. Alderman Matterson, the Chairman of the Water Committee, proposed a resolution declaring that it was expedient for the Council to promote in the next session of Parliament a Bill to empower them to construct additional water-works, and for other purposes. He referred to the increasingly diminished supply of water the city had had during the past few years, and to the necessity which had been generally admitted for increasing the supply, and said that the Committee had consulted with Mr. T. Hawksley and Mr. Durrance. Acting under their advice, they had decided upon a new and comprehensive scheme. Mr. Hawksley had come to the conclusion that they could get no further supply from the Sherbourne Valley; and therefore they had resolved to tap the water-bearing strata in the Sowe Valley—the scheme including the sinking of a new well and the erection of a pumping station at Whitley, near to Willenhall. The water obtained would be pumped through the city to two reservoirs on Coundon Hill. At Radford the springs would be tapped; and the water would flow by gravitation into the existing tanks. He entered at length into the recent history of the water-works, and stated that at present in some parts of the city the supply of water was intermittent. Mr. Burdess seconded the resolution. Mr. Fletcher moved, as an amendment, that the scheme be held over for the present year. Mr. Andrews, in seconding the amendment, severely criticized the new scheme. From a very careful investigation, he was of opinion that the water in the Sherbourne Valley was not exhausted, and that it would not be for two or three years. Alderman Gulson supported the resolution; expressing his belief, from a familiar knowledge of the Sowe Valley, that they would there obtain an abundant supply of pure water from an entirely new source. After considerable discussion, during which the Town Clerk stated that the Bill was of a permissive character, and if passed no money would be expended without the Council being asked to sanction the particular works proposed to be carried out, the amendment was rejected by 25 votes to 5, and the resolution was carried by a like majority.

A report was afterwards presented by the Water Committee, showing an estimated outlay on the works comprised in the Bill, if all are carried out, of £54,827, and of estimated rates, duties, or revenues to arise under the Bill of £2000 per annum, and recommending the putting down of two trial bore-holes, one at Whitley and one at Radford, at a cost at 150 feet depth, of £165 6s. each, and if 200 feet deep, of £203 15s. each. Alderman Matterson proposed the adoption of the report, which Mr. Burdess seconded. After some discussion, the report was adopted.

HEXHAM WATER SUPPLY.—Last Thursday witnessed the successful termination of the scheme of the Hexham Local Board for providing an efficient supply of water for the town, references to which have been made in previous numbers of the JOURNAL. On that day the members of the Board proceeded to the source of supply; and the Chairman (Mr. J. T. Robb) turned the water on into the pipes leading to the town. He afterwards congratulated the members on the successful conclusion of the undertaking; and also expressed their indebtedness to the Contractors (Messrs. Fisher) and the Engineer (Mr. Laws, M. Inst. C.E., of Newcastle-on-Tyne), for the admirable manner in which the work had been carried out. A better supply of water than that which the people of Hexham now had, he asserted, could not be obtained anywhere in the country.

ELLAND WATER SUPPLY.—A report by Mr. G. H. Crowther, Assoc. M. Inst. C.E., on a scheme for the improvement of the water supply of the district was laid before the Elland Local Board at a recent meeting. Condemning the present method of distribution, he proposed that there should be erected a new service reservoir of not less than 480,000 gallons capacity at Dunce Park, 590 feet below sea level, and about 300 feet above the lowest place of service. He proposes then to reverse the system of supply, so that the intended reservoir should give out all the water required below the level of 490 feet; leaving the higher levels to be supplied from existing tanks. The scheme is estimated to give about twice the quantity of water now used; and the cost, including the necessary mains, is estimated at £4600. The consideration of the report was deferred.

## NOTES FROM SCOTLAND.

(FROM OUR EDINBURGH CORRESPONDENT.)

EDINBURGH, *Saturday.*

A new trouble besets the path of the Edinburgh and Leith Gas Commissioners. In the course of the negotiations for transfer of the Edinburgh Gas-Works, a good deal of fight was shown by Messrs. W. Younger & Co., brewers, on account of the alleged contamination of the water in their wells by leakage from two gasholders which were situated some 80 or 90 feet away. To satisfy Messrs. Younger, a clause was inserted in the Act of Parliament, to the effect that, if the leakage should continue at the end of a year after the transfer, the Commissioners should provide a supply of water suitable for brewing purposes to the same amount as that which would be available had there been no such leakage. This clause I have no doubt was accepted by the Commissioners as settling the whole of the disputed matter between them and Messrs. Younger. As a matter of fact, it merely provided the machinery—arbitration—by which one point, that of contamination, could be settled. This week a claim has been intimated by Messrs. Younger, upon the Gas Commissioners, on another branch of the subject—that of the quantity of water. This claim they establish upon an agreement with the Edinburgh Gas Company, entered into in 1869. This agreement appears to have contained the two-fold provision that the water should be equal in quantity to the then supply, and that it should be pure; and it reserved right to Messrs. Younger, in the event of these conditions not being fulfilled, to revert to the previous condition of things, and to enforce their legal rights. They now say that the supply from their wells is unequal to the supply prior to 1869, and demand that the Commissioners should provide them with a suitable supply. The Commissioners were convened on Thursday to consider a letter from Messrs. Youngers' law agents, intimating the claim. On hearing of the agreement, they are said—the meeting, by the way, was private—to have expressed surprise at not hearing before of its existence. Their surprise, however, is not well founded; for in the evidence of Mr. Stenhouse, the Manager to Messrs. Younger, before Lord Ravensworth's Committee last May, they had warning that such an agreement existed. The Commissioners' view of the case, as reported, was that the agreement, even if binding upon them, contained nothing which obliged them to provide "an additional" supply of water for the brewery, and that it was not alleged that the well sunk by the Gas Company had not fulfilled the conditions upon which Messrs. Younger agreed to accept it. This latter being matter of fact, it may almost be taken for granted that the new well has not fulfilled the conditions of the agreement. Before the House of Lords Committee, Mr. Pope, Q.C., stated that the water from the new well was insufficient in quantity, and in consequence of the contamination of their other wells, Messrs. Younger were obliged to procure additional pure water for brewing from a well about four miles away. It is not too much to assume that, in this state of matters, Messrs. Younger are not deriving so much water from the substituted well as they did from all their wells before 1869; and that consequently they are entitled to their remedy under the agreement, if it be still in force. There may be a loophole of escape for the Commissioners if the question were referred to the Law Courts, as it most probably will be. The question is a nice one for the lawyers. Meantime, it has been sent to the Law Commissioners, with power to take the opinion of Counsel. The Commissioners seem to be endeavouring to pose as injured persons by having this agreement with Messrs. Younger sprung upon them; but that consolation ought to be denied them. It is their own fault if they have been surprised. The existence of such an agreement was made known to them at the parliamentary inquiry; and they ought then to have had it produced for their consideration.

It is matter of surprise to many that, in the method of public lighting, the authorities in Edinburgh should up till now, have adhered to the old-fashioned ladder style. The antiquated practice is, however, likely soon to be a thing of the past. Many months ago the Cleaning and Lighting Committee were authorized to introduce a new system; and though the Committee have not been in haste over the matter, they have at last started the pole system of lighting and extinguishing lamps in thirteen districts of the city.

Perhaps one reason why lighting matters have been in a sense neglected in Edinburgh, has been on account of the very questionable principle of linking the inspectorship of lighting with that of cleaning. The cleaning naturally received most attention, and, indeed, but for the generous conduct of the Edinburgh Gas Company, who, in former years, supplied a large quantity of gas to the public lamps more than they were paid for, the lighting of the streets would have been rather a poor affair. The Gas Commissioners are about to effect an improvement in the appliances, beginning with the burners. But, of course, even the finest apparatus will produce no good results unless it be worked intelligently; and a proposal to separate the two departments (which was made a good while ago, but was allowed to slip almost out of mind) has again been revived. The Cleaning and Lighting Committee took up the matter this week, and resolved to recommend the separation. The idea seems to be to withdraw Mr. John Paterson, who has been Inspector for 25 years, from the Cleaning Department, and to retain him as Inspector of Lighting. The proposal will probably be discussed on an early date in the Edinburgh Town Council.

The Dundee Gas-Works *employés* held their annual festival—the nineteenth—last night; and the affair was a great success. This is a pleasant form of interchange of friendly feeling between master and servant, which deserves to be encouraged; and I am tempted to say that, for this reason, I would like to see the practice extended to other towns. In particular, the Edinburgh and Leith Gas Commissioners, at the start of their career, might do worse than cultivate a little friendship with their workmen; and one of the best ways would be by a social meeting of the kind which was such a success in Dundee.

The unfortunate occurrence at Broughty Ferry on the night of the 1st inst., when the gas supply was partially cut off for a short time, formed the subject of conversation at the meeting of the Police Commissioners on Monday night. Mr. Myers, the Gas Manager, reported that the large holder which works on the telescopic principle, was the only one in use that night; and there had probably been some tampering with the valves. He suggested that they should be padlocked, as at the Dundee Gas-Works. Chief Magistrate Orchar thought that they had trusted too much to the water acting properly; and he proposed that, in addition to locking up the valves, they should put in test-cocks, which the Gas Manager should try every week. These suggestions were agreed to.

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(FROM OUR GLASGOW CORRESPONDENT.)

GLASGOW, *Saturday.*

I very seldom allude, if at all, to matters political in my weekly "Notes;" but I may here mention that Mr. John Wilson, the gentleman who, as the Liberal candidate, became member of Parliament for the Govan Division of Lanarkshire yesterday, in succession to the late Sir William Pearce, the eminent shipbuilder, who was a Conservative in politics, is intimately connected in business with the gas industry. He is an extensive manufacturer of malleable iron tubes for gas purposes, with which branch of industry he has been prominently connected for the better part of forty years. He is also a Director, if not the Chairman, of the Glenboig Union Fire-Clay Company, whose bricks and other goods are so well known to gas managers and other persons in many parts of the world who require highly refractory goods for the building of furnaces, &c. Lastly, he has for a number of years been a Director of one of the local mineral oil companies. His opponent in the election contest was Sir John Pender, ex-M.P. for Totnes and the Wick Burghs.

A strange municipal somersault has this week been performed by the Police Commissioners of Wishaw. Part of their business, at the monthly meeting on Monday last, was the consideration of a motion which was passed at a previous meeting in regard to the introduction of gas into the district known as Craigneuk and adjacent part, and collectively forming one of the wards of the burgh. Mr. J. Williams, in opening the question, said that, at the former meeting, it had been unanimously agreed to convey gas to Craigneuk; and as this was the case, he wished the matter gone on with as speedily as possible. It had been delayed so as to avoid the short days; and as the days were now getting longer, it would give time for the carrying out of the work. He moved that gas be introduced into Craigneuk at once; and the motion was seconded by Bailie Russell. A direct amendment was moved by Mr. Ross, who said that at one time he voted for a small pipe being laid; but on looking into the matter, he found that it would require a large one. Other parts of the burgh were, he said, perhaps even worse off in respect of lighting than the Forth Ward, as the ratepayers burned gas and paid for it, and had no street lamps. Mr. Hamilton, who seconded the amendment, thought that there had been some misunderstanding in regard to the vote at the previous meeting of the Commissioners. There were, he said, two distinct motions—one for laying a small main, and another for laying one if the proprietors agreed to take the gas into their properties. He considered it was unfair that they should be held up as having changed their minds, as they had done nothing of the sort. He could not see how any sensible man could vote for spending £1000 for such a purpose in the present financial position of the burgh. At this stage of the discussion, it was agreed to have the minutes inspected; and they showed that the former vote had been unanimous, in reference to which Mr. Hamilton remarked that he did not understand the vote in that light. After some further remarks, the vote was taken, when the Provost and five other Commissioners were in favour of the amendment, and six members supported the motion. The Provost then gave his casting vote in favour of gas not being taken to Craigneuk. This "right-about-face" policy of the supporters of the amendment will not unlikely be remembered against them when the November elections again come round.

At the last meeting of the Paisley Town Council, there were submitted the minutes of the Gas Committee, containing a recommendation that the salary of Mr. G. R. Hislop, the Engineer and Manager of the gas-works, be increased from £350 to £400 per annum, and that he now pay his own income-tax, which has hitherto been paid by the Gas Commissioners. Mr. Hislop's professional friends will doubtless be of the same opinion as the Paisley Gas Committee—viz., that he is well entitled to such a recognition as is contained in this increase of salary.

Yesterday, shortly before noon, the dead body of Joseph Kerr, a man employed at the Langholm Gas-Works, was found in the purifier. The deceased had gone into the purifier to work, and had failed to shut the valves properly; the result being that the gas rushed in from the holder, and suffocated him in a few minutes.

Yesterday at noon sixty shares of the Stirling Gaslight Company were exposed for sale by public auction at the upset price of £6 15s. per share. After some keen competition, thirty of them were sold at £7 17s. per share, which was an advance of 22s.; and the other thirty were knocked down at £7 16s. per share, being an advance of 21s. per share.

The Glasgow pig-iron market has been flat throughout the week; and a large amount of business has been done in warrants. Some influence has been exerted on the market by the action taken by the miners in favour of higher wages. The "bulls" have had the best of it; and "bears" have been compelled to buy, in order to cover sales. Very little business has been done in special brands of makers' iron; and in one instance the makers have intimated a reduction of 1s. per ton on their brands. Yesterday afternoon 41s. 5d. and 41s. 4d. per ton cash were paid for Scotch warrants; and hematite iron changed hands at 44s. 10d. one month.

In the local coal trade, a very satisfactory state of affairs is reported from day to day. There is a good export demand; and the only little difficulty that shows itself is a scarcity of vessels. Prices all round remain very firm; and a fresh advance of wages has been granted to many of the miners.

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THE BARROW CORPORATION WATER SCHEME.—It is reported that opposition to the scheme of the Barrow Corporation for bringing water from the River Duddon, is gaining strength daily. The scheme will be opposed by the riparian owners of the Duddon Valley, on the ground that it is proposed to extract from the river more water than can be disposed of with due regard to landscape, fishery, and other rights. On the other hand, it is understood that the Hæmatite Steel Company, in their scheme, have made complete provisional arrangements with these riparian owners by which they will only extract water from the Duddon when storms furnish extra supplies—that, in fact, they will never take water when less than six or seven million gallons a day are running down the stream. The Corporation propose, not only to take sufficient to supply the Steel Company, but the wants of other users; and this is probably the reason the landowners of Duddon Valley contemplate opposing their scheme.

THE ARTESIAN WELL OF THE GAINSBOROUGH LOCAL BOARD.—The Gainsborough Local Board have achieved a great success with their artesian well, which is said to be one of the deepest bores in England. Acting on the advice of their engineers and geological adviser, the Board, not finding sufficient water at 1100 feet, decided to bore an additional 100 feet into the sandstone, and also to deepen the main pumping well to a depth of 200 feet from the surface. When tests were made in August last with pumps 75 feet from the surface, a test-tank of 1000 gallons was filled in 8½ minutes; it having taken 12 minutes for the same operation in the previous year. Since August the Water-Works Committee lowered the working barrel of the pump to the depth of 190 feet—an additional 115 feet—with the satisfactory result that the tank is now filled in 4¼ minutes. The yield of water is so great at this point that it is flowing considerably above the pump, which is not of sufficient capacity, though running 18 strokes to the minute, to reduce the head of water; and there is no doubt that the present yield will reach from 18,000 to 20,000 gallons an hour at 200 feet depth. Nothing now remains to be done but to sink a well, and attach permanent pumping plant. This highly successful result has been attained at the cost of about £5000. It is stated that the members of the Society of Arts intend shortly to visit this well.

## CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Jan.* 19.

*Sulphate of Ammonia.*—The demand, although almost entirely from middlemen, has been sufficient to cause a further advance in values; and notwithstanding that £12 10s. to £12 12s 6d. was still accepted during the early part of the week, makers are now refusing orders at £12 15s., and consider themselves justified by the position in holding for £13. As nitrate is advancing (although it has not improved as much as sulphate this time), there is a possibility of the higher figure being reached again, as indeed it was in January last year. But, unless supported by nitrate, the extreme values may not be maintained. The requirements abroad naturally form a great factor in the future; and in this respect there can be no doubt that large requirements have yet to be filled in France, and also in Belgium and Spain. Germany is lethargic; but the consumers there will perhaps not remain passive, if the weather continues mild, and heralds an early season. There has been some rumour of a "bull" movement (the outcome, no doubt, of probable high February prices in nitrate, if cargoes do not turn up freely); but, on the other hand, those who require sulphate for near delivery are not remiss in their attempts to throw cold water upon the position, by unsupported statements of accumulating heavy stocks at Continental ports. Stocks on this side are meanwhile moving off readily; and there is at the moment exceptionally little offering.

LONDON, *Jan.* 19.

*Tar Products.*—Pitch is in excellent demand, and is likely to be dearer. Benzoles are neglected; and whilst anthracene is moving off slowly on old contracts, little or no new business is being done. Oils are in slightly better demand; but there appear to be very large stocks in the hands of makers. To-day's prices are:—Tar, according to position, 18s. to 24s. per ton. Benzole, 90 per cent., 3s. per gallon; 50 per cent., 2s. 5d. Toluol, 1s. 6d. per gallon. Solvent naphtha, 1s. 3d. per gallon. Crude naphtha, 30 per cent., 1s. 2d. per gallon. Light oil, 3d. per gallon. Creosote, 2d. per gallon. Pitch, 18s. 6d. to 21s. 6d. per ton. Carbolic acid (crude), 3s. 4½d. per gallon. Cresylic acid, 10½d. per gallon. Tar salts, 15s. per ton. Anthracene, 30 per cent., "A" quality, 1s. 4d. per unit; "B" quality, 1s. 2d.

*Ammonia Products.*—Sulphate continues firm, and buyers are eager to close for the spring months; and owing to the high price of nitrate, sulphate is likely to reach higher prices during the next two or three months. Prices: Gas liquor (5° Twaddel), 8s. per ton, with a rise or fall of 1s. 6d. per degree. Sulphate of ammonia, £12 10s. to £12 12s. 6d. per ton, less discount. Liquor ammonia, 2d. per lb. Carbonate of ammonia, 3½d. per lb. Muriate of ammonia, brown, £20 per ton; white, £26 10s. Sal-ammoniac, £32 per ton.

From the *Chemical Trade Journal*, Jan. 19.—Benzoles are still reported to be weak; but to-day's prices may be quoted at 3s. 2d. for 90's, and 2s. 6d. to 2s. 7d. for 50's, which seem firmer than 90's. In solvent naphtha there is still a good business doing; and creosote is moving off quite as freely as can be expected. Crude carbolic acid, 60's, is practically unchanged; while but little is doing in anthracene—in fact, it being almost impossible at the present moment to raise the price of alizarine, we can hardly hope for better prices in anthracene. Pitch has been moving off very freely of late; but values of this article remain unchanged. The sulphate of ammonia market is very steady; and business is being done at Hull and London at £12 12s. 6d. The market is reported very firm at Leith; and to-day's prices may be taken as £12 10s. at that port. From London we hear that Beckton price is £12 7s. 6d.; while outside makes are fetching a little over £12 10s. From the Continent we hear the sulphate of ammonia market is in a very satisfactory condition; and our correspondents at the principal centres inform us that values are likely to go higher, as the manufacturers have sold forward at good prices, so that there is very little offering outside of these transactions. We repeat, however, the caution given in several numbers, that it will be extremely unwise to force up values too much. There is no reason at the present moment why prices should recede; and, on the other hand, there is not much reason why they should be advanced.

THE MORLEY CORPORATION AND THE GAS COMPANY.—At a meeting of the Morley Town Council last Tuesday, a Sub-Committee appointed with reference to the proposed Bill for conferring further powers upon the Morley Gas Company recommended that authority should be given them to engage the services of a gas engineer at such a fee as they might determine, to present a full report on the Bill, and for that purpose to make such investigation as the Committee might decide; and also to negotiate with the Company, and to take any necessary steps to oppose the Bill. The recommendations were approved.

THE PROPOSED EXTENSION OF BURNLEY.—A special meeting of the Padiham Local Board was held last week, for the purposes of authorizing the promotion of a Bill for the extension of the district, and to consider the proposed Bill of the Burnley Corporation. Mr. Eastham, the Board's Solicitor, explained that the Corporation ought to repeal portions of the various Padiham Local Acts, so as to prevent the Board continuing to supply gas or water within the township of Habergham Eaves, which it is proposed to add to Burnley. The Corporation also asked to be empowered to acquire the Board's mains, &c., in the same township; and he said that if the clauses passed in their present shape, the Corporation would have the right of purchase at the price of old metal, without paying one penny of compensation to the Board. It was unanimously decided to oppose the Burnley application, and to proceed with the Bill which the Local Board have lodged.

THE ELECTRIC LIGHTING AT BARNET.—At the meeting of the Barnet Local Board last Tuesday, Mr. James asked whether any reason had been given for the failure of the electric light on the previous Friday evening. The lamps, he explained, were not exactly out, but they were like "red bars of iron, giving no light." The Surveyor, in reply to the Chairman, said he was unable to give any information.' He had not, he said, reported upon the electric light during the past fortnight. He had no instructions from the Board; no Lighting Inspector had been appointed; and he did not want to volunteer a report. The Chairman said it had occurred to him, and the idea commended itself to others, that they ought to have someone who really understood the matter, and who could give an independent and authoritative opinion whether the lamps were up to 32-candle power, as provided for in the contract. They had no means of settling it for themselves; and they wanted the opinion of an expert who could swear to what he stated. Mr. James agreed that they should have a report from an expert to guide them; but at the same time he thought that they should have an explanation as to this failure. A long discussion ensued as to whether the "so-called 300-candle light" in the High Street did not affect the other lights; some contending that this lamp was robbing the smaller ones, and so keeping parts of the district in darkness. In the end, it was agreed to appoint an expert to report upon the whole subject of the electric lighting of the district.

BORING FOR WATER IN THE VALLEY OF THE THAMES AT WINDSOR.—It having been proposed to sink a well to supply water to the Workhouse at Old Windsor, and a question having been raised as to the probability of water being found in sufficient quantity to justify the expense of sinking a well, Mr. William Whitaker, B.A., F.R.S., &c., has carried out a careful investigation on the subject (considering the evidence given by other wells in the neighbourhood), and is of opinion that the abundance of water at Datchet—at the Slough Water-Works—shows that there is plenty of water in the chalk in the district, which gives good reason to hope for success in getting some of it at the Windsor Union. In the course of his report to the Guardians, he says: As a general rule, water is found in greatest quantity in the uppermost part of the chalk—excepting, of course, in the high parts of the chalk tracts, where the underground water-level is naturally at a considerable depth; but with such tracts we are not now concerned. In the neighbourhood of Windsor, however, the above-mentioned general rule seems not to hold together, judging by the latest successful works for getting water from the chalk. Thus, in the well at Burge's Brewery, Windsor (made by Messrs. Isler), the supply was not got until the boring had reached a considerable depth in the chalk, when a much larger amount than you need was obtained. Again, at the new Slough Water-Works (Datchet), the chief supply is got, apparently, at a considerable depth in the chalk; and, from information given me on the spot, there must be a large additional amount available. I recommend, therefore, that your boring should be carried deeper into the chalk. As, however, where the chalk is capped by a thick mass of the tertiary beds (London clay, &c.), a large supply is more rarely got than in a tract where the chalk is at or near the surface, I do not count on your getting so great an amount as has been got at Burge's Brewery (Windsor), where the chalk was touched about 87 feet down, or at Datchet, where the depth to it was about 117 feet. In your case that depth is 267 feet. The amount you want is, however, less than that got in the above places. Should an insufficient quantity be found by deeper boring in the chalk, a further supply would seem to be obtainable from the sand-beds that occur at the depth of 232 to 252 feet in your boring (according to the specimens at the Union). That water has passed through part of these sand-beds is, I think, clearly shown by the sample from their lower part. This is a clean, sharp sand, from which all other matter has been washed out; it is a sand very favourable for the passage of water. Of course, to use such a sand supply, due precautions would have to be taken to avoid the flowing-in of sand into the bore-hole (a process which, perhaps, has caused the failure of the old boring). I regard this source, therefore, only as an alternative, in case the needful supply should not be got from the chalk.

## GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For STOCK MARKET INTELLIGENCE, see *ante*, p. 153.)

| Issue. | Share | When ex-Dividend. | Dividend or Div. & Bonus. | NAME. | Paid per Share | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|---|
| £ | | | p. c. | GAS COMPANIES. | | | | £ s. d |
| 590,000 | 10 | 12 Oct. | 10½ | Alliance & Dublin 10 p. c. | 10 | 18—19 | .. | 5 10 6 |
| 100,000 | 10 | „ | 7½ | Do. 7 p. c. | 10 | 12½—13½ | .. | 5 11 1 |
| 800,000 | 100 | 2 Jan. | 5 | Australian (Sydney) 5% Deb. | 100 | 110—112 | .. | 4 9 3 |
| 100,000 | 20 | 29 Nov. | 10 | Bahia, Limited | 20 | 24—25 | .. | 8 0 0 |
| 200,000 | 5 | 14 Nov. | 7½ | Bombay, Limited | 5 | 6¾—7¼ | .. | 5 8 5 |
| 40,000 | 5 | „ | 7½ | Do. New | 4 | 5¾—6¼ | +¼ | 5 4 2 |
| 380,000 | Stck. | 29 Aug. | 11½ | Brentford Consolidated | 100 | 225—230 | +2 | 5 2 2 |
| 125,000 | „ | „ | 8½ | Do. New | 100 | 167—173 | +2 | 5 1 9 |
| 220,000 | 20 | 13 Sept. | 10½ | Brighton & Hove, Original | 20 | 43—45 | .. | 4 13 4 |
| 320,000 | 20 | 28 Sept. | 11½ | British | 20 | 43—45 | .. | 5 0 0 |
| 50,000 | 10 | 15 Sept. | 11 | Bromley, Ordinary 10 p. c. | 10 | 20—22 | .. | 5 0 0 |
| 39,000 | 10 | „ | 8 | Do. 7 p. c. | 10 | 13¼—14½ | .. | 5 10 4 |
| 328,750 | 10 | 14 Nov. | 8 | Buenos Ayres (New) Limited | 10 | 13½—14½ | .. | 5 10 4 |
| 200,000 | 100 | 2 Jan. | 6 | Do. 6 p. c. Deb. | 100 | 107—109 | .. | 5 10 1 |
| 150,000 | 20 | 10 Aug. | 7 | Cagliari, Limited | 20 | 26—28 | .. | 5 0 0 |
| 550,000 | Stck. | 12 Oct. | 13⅜ | Commercial, Old Stock | 100 | 260—265 | .. | 5 3 9 |
| 130,000 | „ | „ | 10½ | Do. New do. | 100 | 212—217 | .. | 4 19 1 |
| 180,000 | „ | 28 Dec. | 4½ | Do. 4½ p. c. Deb. do. | 100 | 122—125 | .. | 3 12 0 |
| 557,320 | 20 | 13 Dec. | 13 | Continental Union, Limited | 20 | 46—48 | .. | 5 8 4 |
| 242,680 | 20 | „ | 13 | Do. New '69 & '72 | 14 | 32—34 | +1 | 5 6 7 |
| 200,000 | 20 | „ | 10 | Do. 7 p. c. Pref. | 20 | 37—39 | .. | 5 2 6 |
| 75,000 | Stck. | 28 Sept. | 10 | Crystal Palace District | 100 | 205—215 | .. | 4 13 0 |
| 234,060 | 10 | 27 July | 13 | European, Limited | 10 | 25½—26½ | .. | 4 18 1 |
| 120,000 | 10 | „ | 13 | Do. New | 7½ | 18—19 | .. | 5 2 7 |
| 854,060 | 10 | „ | 13 | Do. do. | 5 | 12—13 | .. | 5 0 0 |
| 5,468,600 | Stck. | 29 Aug. | 13 | Gaslight & Coke, A, Ordinary | 100 | 259—264 | +2 | 4 18 5 |
| 100,000 | „ | „ | 4 | Do. B, 4 p. c. max. | 100 | 100—105 | .. | 3 16 3 |
| 665,000 | „ | „ | 10 | Do. C, D, & E, 10 p.c. Pf. | 100 | 261—265 | .. | 3 15 6 |
| 90,000 | „ | „ | 5 | Do F, 5 p. c. Prf. | 100 | 125—130 | .. | 3 16 11 |
| 60,000 | „ | „ | 7½ | Do. G, 7½ p. c. do. | 100 | 182—187 | .. | 4 0 2 |
| 1,300,000 | „ | „ | 7 | Do. H, 7 p. c. max. | 100 | 169—174 | .. | 4 0 5 |
| 463,000 | „ | „ | 10 | Do. J, 10 p. c. Prf. | 100 | 260—264 | .. | 3 15 10 |
| 1,051,150 | „ | 13 Dec. | 4 | Do. 4 p. c. Deb. Stk. | 100 | 117—120 | .. | 3 6 8 |
| 294,850 | „ | „ | 4½ | Do. 4½ p. c. do. | 100 | 122—127 | .. | 3 10 10 |
| 650,000 | „ | „ | 6 | Do. 6 p. c. do. | 100 | 172—177 | .. | 3 7 10 |
| 3,600,000 | Stck. | 14 Nov. | 10 | Imperial Continental | 100 | 208—213 | −1 | 4 13 10 |
| 75,000 | 5 | 13 Dec. | 6 | Malta & Mediterranean, Ltd | 5 | 5—5½ | .. | 5 9 1 |
| 560,000 | 100 | 1 Oct. | 5 | Met. of Melbourne, 5 p.c. Deb. | 100 | 114—116 | .. | 4 6 2 |
| 541,920 | 20 | 29 Nov. | 6 | Monte Video, Limited | 20 | 19—20 | .. | 6 0 0 |
| 150,000 | 5 | 29 Nov. | 10 | Oriental, Limited | 5 | 9¼—9⅝ | +⅛ | 5 2 7 |
| 60,000 | 5 | 28 Sept. | 7 | Ottoman, Limited | 5 | 6—7 | .. | 5 0 0 |
| 166,870 | 10 | 16 Jan. | 4 | Pará, Limited | 10 | 5½—6* | .. | 6 13 4 |
| 420,000 | 100 | 2 Nov. | 6 | People's Gas of Chicago— 1st Mtg. Bds. | 100 | 104—107 | .. | 5 12 1 |
| 500,000 | 100 | 1 Dec. | 6 | 2nd Do. | 100 | 92—97 | .. | 6 3 9 |
| 100,000 | 10 | 12 Oct. | 10 | San Paulo, Limited | 10 | 15½—16½ | .. | 6 1 2 |
| 500,000 | Stck. | 29 Aug. | 15⅜ | South Metropolitan, A Stock | 100 | 302—307 | .. | 5 0 11 |
| 1,550,000 | „ | „ | 12 | Do. B do. | 100 | 237—242 | .. | 4 19 3 |
| 141,500 | „ | „ | 13 | Do. C do. | 100 | 245—255 | .. | 5 1 11 |
| 600,000 | „ | 28 Dec. | 5 | Do. 5 p. c. Deb. Stk. | 100 | 137—140 | .. | 3 11 5 |
| 60,000 | 5 | 29 Aug. | 11 | Tottenham & Edm'ntn, Orig. | 5 | 11—13 | .. | 4 4 0 |
| | | | | | | * Ex div | | |
| | | | | WATER COMPANIES. | | | | |
| 717,467 | Stck. | 28 Dec. | 9 | Chelsea, Ordinary | 100 | 258—263 | +1 | 3 8 5 |
| 1,720,560 | Stck. | 12 Oct. | 7 | East London, Ordinary | 100 | 202—205 | +1 | 3 8 3 |
| 700,000 | 50 | 13 Dec. | 9 | Grand Junction | 50 | 121—125 | .. | 3 12 0 |
| 708,000 | Stck. | 10 Aug. | 10½ | Kent | 100 | 277—282 | .. | 3 14 5 |
| 1,043,800 | 100 | 28 Dec. | 9 | Lambeth, 10 p. c. max. | 100 | 253—258 | +1 | 3 9 9 |
| 406,200 | 100 | „ | 7½ | Do. 7½ p. c. max. | 100 | 197—202 | .. | 3 14 3 |
| 200,000 | Stck. | 28 Sept. | 4 | Do. 4 p. c. Deb. Stk. | 100 | 118—122 | .. | 3 5 7 |
| 500,000 | 100 | 27 July | 12½ | New River, New Shares | 100 | 350—360 | .. | 3 7 4 |
| 1,000,000 | Stck. | „ | 4 | Do. 4 p. c. Deb. Stk. | 100 | 124—128 | .. | 3 2 6 |
| 902,300 | Stck. | 13 Dec. | 6 | S'thwk & V'xhall, 10 p.c. max. | 100 | 167—172 | .. | 3 9 9 |
| 126,500 | 100 | „ | 6 | Do. 7½ p. c. do. | 100 | 160—165 | .. | 3 12 9 |
| 1,155,066 | Stck. | „ | 10 | West Middlesex | 100 | 262—267 | .. | 3 14 11 |

BELL'S ASBESTOS COMPANY, LIMITED.—The Directors of Bell's Asbestos Company, Limited, announce a dividend of 15s. per share.

AN ELECTRIC LIGHT COMPANY FOR NEWCASTLE.—The Newcastle and District Electric Lighting Company has been registered with a capital of £50,000, divided into 5000 shares of £10 each. This is the second Electric Lighting Company announced during the past fortnight to carry on operations in the Newcastle district (*ante*, p. 121).

THE GRIEVANCES OF THE STOKERS AT THE HALIFAX GAS-WORKS.—There has been another threatened strike at the Halifax Corporation Gas-Works. One of the workmen did not send in his notice to leave when the others did recently; and the men have demanded that he should be reduced. This the Gas Committee set their faces against, and refused to do. The consequence was that the rest sent in their resignations. Happily the difficulty has been amicably settled; the man in question retaining his position, and the resignations being withdrawn.

THE PROGRESS OF THE VYRNWY WATER-WORKS.—The demolition of the village of Llanwdyn, the site of which is to be occupied by Lake Vyrnwy, has now been completed. Most of the buildings, including the parish church, have been blown up by dynamite; and upwards of a hundred human skulls and remains have been removed and re-interred in the new burial grounds. Some fine old yew trees in the churchyard have also been uprooted and removed. The population of the whole parish is only about 500; and those who have been displaced are fully compensated.——The annual meeting of the Severn Fishery Board (the largest Fishery Board in the kingdom) was held at Worcester last Thursday. The annual report, in reviewing the proceedings of the past year, alluded to the completion of the dam at Llanwdyn, on the reservoir at the head of the Severn for supplying water to Liverpool. The works, it was stated, were completed; and the Lake Vyrnwy, which would be five miles long and a mile broad, was now filling up. They were thus enabled to judge what would be the supply of water permitted to flow into the Severn by the "compensation" valve. A rainfall which used to flood the Vyrnwy would not henceforth be more than brink full; and so far it was evident that the fears entertained by the Board, and which had induced them to oppose the Bill, were in no way exaggerated.

THE DUNDEE GAS-WORKS EMPLOYES FESTIVAL.—Last Friday the nineteenth annual festival of the Dundee Gas Commissioners' *employés* was held. There was a large attendance; the company, which included several of the Commissioners and their friends, numbering about 500. Mr. Joseph Lindsay, the Convener of the Works Committee, presided; and among those on the platform were: Mr. John M'Crae, the Gas Engineer, Mr. A. I. Strachan, the Treasurer of the Gas Department, Mr. W. M'Crae, the Assistant Engineer, and Mr. W. Miller, the Foreman of the works. After tea, the Chairman made a few remarks. He said that most of those present had been employed at the works much longer than he had been connected with them—although it was a good many years now since he first became a Gas Commissioner; and they could not fail to notice the great improvements which had been carried out. When the Commissioners took over the works from the old Company, most of the plant was obsolete; but this had now been entirely cleared away, and they had got one of the best equipped gas-works in the kingdom. And not only were the works in a very efficient state; but in Mr. M'Crae they had a very efficient, painstaking, and scientific Gas Engineer. Mr. M'Crae took a very lively interest in all that tended to the comfort and welfare of those under him; and he had always been ably backed up by the Commissioners. In the course of the evening, an excellent musical programme was carried out to the thorough satisfaction of the audience. At the close of the concert, Treasurer Nicoll, in the course of a few felicitous remarks, proposed a vote of thanks to Mr. Lindsay for presiding, which was cordially awarded.

PROJECTED ADDITIONAL WATER SUPPLY FOR STAFFORD.—Last Thursday Mr. S. J. Smith held an inquiry at Stafford, on behalf of the Local Government Board, into an application by the Corporation for permission to borrow money for works of water supply. The Town Clerk (Mr. M. F. Blakiston) explained the scheme, the site for which was on land at Milford, which Lord Lichfield had offered to let the Corporation have on generous terms. Close by, on the same geological formation, the well of the North Western Railway Company had been furnishing an excellent supply of water for a number of years; and when the permanent well was carried down to a depth of 30 feet, the inflow of water overcame the pumps, which were lifting a million gallons a day. It was calculated that the cost of the works outside the borough would be £12,000, which at 3 per cent. per annum, would be £420 a year; and that the cost of pumping would be about £400—making a total of £820. The consumption of water among a population of 20,000 would give £821 a year at the rate of 2¼d. per 1000 gallons. With £3000 the cost of the works within the borough, and £22,000 already spent on failures and other works in connection with water supply in the past, the total annual revenue required would be about £1645, which at the rate of consumption already indicated, would be 4½d. per 1000 gallons. The Inspector remarked that Stafford would be a good deal better off in this respect than many other towns. It transpired that the Corporation had unexhausted borrowing powers to the amount of £13,000, and that they had given notice to apply for further powers to the extent of £5000 to enable them if necessary to extend their operations to neighbouring parishes. On the recommendation of the Inspector, it was decided to increase the application to £7000. After the inquiry, the Inspector visited the site, with which he appeared much pleased.


## GWYNNE & CO., ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

## GWYNNE & BEALE'S PATENT GAS EXHAUSTERS & ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 2698.

**Exhausters of nearly all sizes in Stock.**

**Prize Medals at all the Great International Exhibitions.**

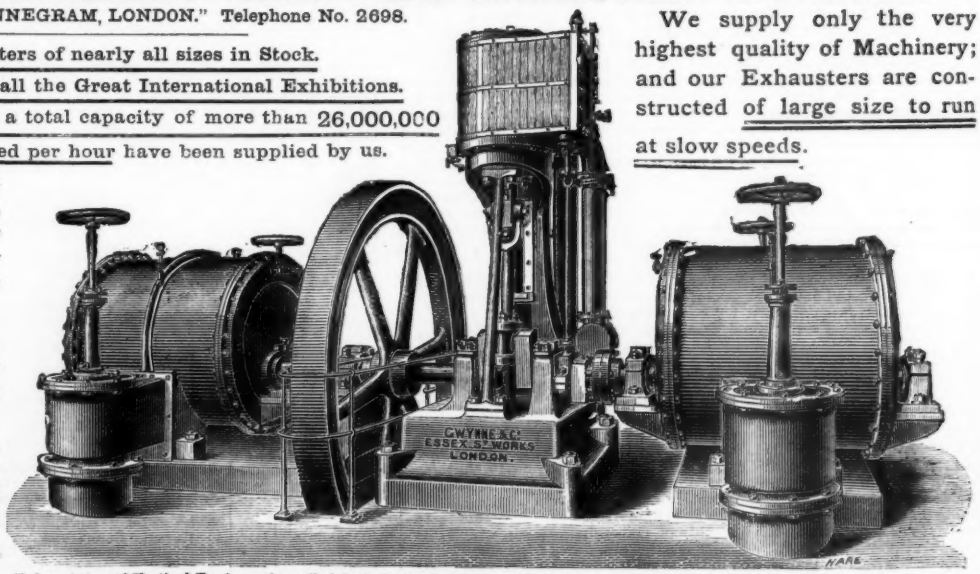
**Exhausters equal to a total capacity of more than 26,000,000 cubic feet passed per hour have been supplied by us.**

*Our new Patent Non-Fluctuating Exhausters, to work without the slightest oscillation or variation in pressure, are strongly recommended.*

MAKERS OF EVERY DESCRIPTION OF HYDRAULIC AND GAS MACHINERY.

**Gwynne & Co.'s New Catalogue and List of Testimonials can now be obtained on application.**

We supply only the very highest quality of Machinery; and our Exhausters are constructed of large size to run at slow speeds.




Exhausters and Vertical Engine as supplied for both the Fulham and Bromley-by-Bow Stations of The Gaslight and Coke Company.

OXIDE OF IRON.

**O'NEILL'S Oxide has a larger annual** sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

**ANDREW STEPHENSON, Agent for** the GAS PURIFICATION AND CHEMICAL COMPANY, Limited, Palmerston Buildings, Old Broad Street, LONDON, E.C.

CANNEL COAL, &c.

**JOHN ROMANS & SON, EDINBURGH.**
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / No. 54, BERNARD STREET, LEITH, } SCOTLAND.

**SULPHURIC ACID, B.O.V., for Sulphate** of Ammonia Making. Guaranteed clear, of full strength, and to produce a fine white-coloured salt Delivered in carboys or railway tank waggons.
For prices and terms address BALE, BAKER, AND CO., 120 & 121, Newgate Street, LONDON.

**TIMMIS & CO., of STOURBRIDGE**
Make only the best quality of FIRE-CLAY RETORTS, BRICKS, TILES, & LUMPS. Also SPECIAL SILICA BRICKS, to stand great heats. All descriptions kept in Stock.
For Prices apply to JAMES LAWRIE AND CO, 68, Old Broad Street, E.C., Sole Agents for London and District. Telegraphic Address: "EIRWAL, LONDON."

**ALEX. WRIGHT & Co., 55, 55a, and 56,** MILLBANK STREET, LONDON, S.W.
[Telegraphic Address: "PRECISION LONDON."]
Makers of Wet and Dry Gas-Meters, Station Meters and Governors, Photometers, and Gas-Testing Apparatus, Test Gasholders and Meters, Registering and other Gauges, &c., &c.
*** See Advertisement on Page III. of the Wrapper of last week's issue.

**W. C. HOLMES & Co., Huddersfield,** AND 80, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. 177 of this week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

**BALE, BAKER, & CO., direct Importers** from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased.
120 and 121, NEWGATE STREET, LONDON, E.C.

TUBES.

**FOR Gas, Steam, and Water; Galvanized,** White Enamelled, and Hydraulic Tubes and Co.
JOHN SPENCER, Globe Tube Works, WEDNESBURY, and 14, Great St. Thomas Apostle, LONDON.

SULPHURIC ACID.

**JOHN NICHOLSON & SONS, Chemical** Works, LEEDS, specially produce this ACID for making SULPHATE OF AMMONIA of high quality and colour.
Highest References and all particulars supplied on application.

**HUTCHINSON BROTHERS, Barnsley,** Gas Engineers and Contractors, Makers of Gas-Meters and General Gas Apparatus, Sulphate of Ammonia Plant, Tools, and Sundries.
*** See large Advertisement in last week's issue page 101.

# The Gas, Water, & General Investment Trust

LIMITED.

*Incorporated under the Companies Acts, 1862 to 1888, whereby the liability of Shareholders is limited.*

## CAPITAL: £1,500,000, divided into 150,000 Shares of £10 each.

### FIRST ISSUE, 75,000 SHARES

**At £10 10s. per Share (5 per cent. Premium). At this price, and on the terms of this Prospectus, 40,000 Shares have already been applied for.**

*Payments will be made as under:*

| | |
|---|---|
| **10s. per Share on Application.** | **£2 per Share on the 2nd of April, 1889.** |
| **£2 „ Allotment.** (Of this payment 10s. will be allocated to the premium.) | **£2 „ the 2nd of May „** |
| **£2 „ the 2nd of March, 1889.** | **£2 „ the 3rd of June „** |

*The premium will be carried to a Reserve Fund, out of which the Preliminary Expenses of the Company will be paid; and the balance will remain in the hands of the Directors for investment.*

**The Shares now offered for Subscription will be converted when fully paid up into Preferred and Deferred Stock in the proportion of three-fifths of Preferred to two-fifths of Deferred. The Preferred Stock will be entitled to a Cumulative Preferential Dividend at the rate of 4½ per cent. per annum, and to a Preferential Charge as to Capital; and the Deferred Stock will be entitled to all the surplus net profits, after providing for the Dividend on the Preferred Stock.**

**It is proposed in due course to issue Debenture Stock to an amount equal to the Subscribed Capital of the Company.**

*Subscribers can pay up in full on Allotment. Interest at the rate of 4 per cent. per annum will be allowed on such prepayment.*

**Subscription Lists will be opened on Wednesday, the 23rd of January, 1889, and will be closed on or before Thursday, the 24th, at Four o'clock.**

**Directors.**

THOMAS SALT, Esq., M.P. (Chairman of the North Staffordshire Railway Company), *Chairman.*
THE HON. EVELYN ASHLEY (Chairman of the Railway Passengers' Assurance Company).
CHARLES BARCLAY, Esq. (Director of the National Provincial Bank of England).
JOHN BOUSTEAD, Esq. (Director of the Lambeth Water-Works).
JOSEPH BEVAN BRAITHWAITE, Esq., 27, Austin Friars.
LORD CLAUD HAMILTON (Deputy-Chairman of the Trustees, Executors, and Securities Insurance Corporation).
THE HON. HENRY NOEL (Director of The Gaslight and Coke Company).

**Bankers.**

THE NATIONAL PROVINCIAL BANK OF ENGLAND, Limited (112, Bishopsgate Street, E.C.), and BRANCHES.
LLOYD'S, BARNETT'S, and BOSANQUET'S BANK, Limited (72, Lombard Street, E.C.), and BRANCHES.

**Brokers.**

Messrs. FOSTER & BRAITHWAITE, 27, Austin Friars, E.C.
Messrs. COLEMAN & MAY, 2, Tokenhouse Buildings, E.C.

**Solicitors.**

Messrs. PAINE, SON, & POLLOCK, 14, St. Helen's Place, E.C.

**Auditors.**

Messrs. DELOITTE, DEVER, GRIFFITHS, & CO., Lothbury, E.C.

| **Secretary.** | **Offices.** |
|---|---|
| JAMES A. KELMAN, Esq. | WINCHESTER HOUSE, E.C. |

## PROSPECTUS.

This Company has been formed for the purpose of carrying out the well-known principles of a Trust Company; its object being to purchase and hold investments in Gas and Water Undertakings, or other Securities, as the Directors may from time to time determine.

By this system the Capital of the Company will be spread over a large number of Securities in such a manner that, by the principle of average, the investor will obtain a good rate of interest, without being subject to violent fluctuations in dividends, or exposed to the necessarily precarious nature of an investment in any one concern, however sound.

Powers are taken to issue Debenture Stock to an amount not exceeding the amount of the Share Capital of the Company from time to time subscribed; and the investment of this additional sum will, after providing for the Debenture Interest, place an annual surplus at the disposal of the Directors, sufficient to materially increase the Dividends on the Deferred Stock. It is provided that all registered Securities shall stand either in the name of the Company or in the names of at least two Directors. In addition, it is provided that no more than one-twentieth of the subscribed funds of the Company shall be invested in any one Security.

The favour shown by investors to the Stocks of similar Trust Companies is shown by the following Table:

| — | Present Price. | |
|---|---|---|
| | 5 per cent. Preferred Stock. | Deferred Stock. |
| Foreign and Colonial Government Trust . | 127 | 140 paying 7 p.c. |
| Mercantile Investment and General Trust . | 118 | 119 „ 7 „ |
| Foreign, American, and General Trust . . | 119 | 117 „ 6 „ |
| American Investment Trust . . . . . | 119 | 119 „ 6½ „ |
| Army and Navy Investment Trust . . . | 115 | 115 „ 7 „ |

The Gas, Water, and General Investment Trust will be managed on the same lines as the above and other well-known Companies—the only difference being that Gas and Water Undertakings will receive especial attention; and in all cases where the Directors think it desirable, a Special Report on the Security will be obtained from competent engineers.

In order that the Company may start business with its Capital intact, and in possession of a substantial Reserve Fund, the Directors have decided to make the first issue at a premium of Ten Shillings per Share. It will be obvious to subscribers that nothing but advantage can accrue to the Shareholders from this decision, as the bulk of the Premium will be invested in interest-bearing Securities.

The charge for administration, which includes rent, Directors' fees, salaries of staff, and all current expenses, has, in the terms of the Articles of Association, been fixed at a sum not exceeding ¼ per cent. upon the Share and Debenture Capital subscribed.

Where no allotment is made, the deposit will be returned in full.

No promotion expenses of any kind have been or will be incurred; the expense of incorporating the Company, and the payment of all charges incidental to the issue of this prospectus, will be forthwith discharged out of the amount to be received from the premium.

**The Articles of Association can be seen and inspected at the Offices of the Company's Solicitors.**

**Prospectuses and Forms of Application can be obtained from the Bankers, Brokers, and at the Offices of the Company, Winchester House, Old Broad Street, E.C.**

*January*, 1889.

THE GAS INSTITUTE.

**THE Council respectfully request that** all SUBSCRIPTIONS and COMMUNICATIONS relative to THE GAS INSTITUTE be addressed to Mr. William Longworth, Gas Offices, Guildford, who has been appointed Honorary Secretary, *pro tem.*

Dec. 29, 1888.

---

**WANTED, by a Total Abstainer, a** Situation in a Gas-Works as WORKING MANAGER or FOREMAN. Has had good practical experience in Carbonizing, Fitting, Main and Service Laying, Reading Meters, and Repairs connected with Gas Plant. Good testimonials. Married.

Address No. 1668, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

---

**ASSISTANT Manager of large Provincial** Gas and Water Works is desirous of a change, as WORKS SUPERINTENDENT or to Manage small Works. Thorough practical man in every Department, including Regenerator Firing and Sulphate Making. Eighteen years' practical experience; total abstainer; aged 34; married. No objection to settle abroad.

Address No. 1669, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

---

**WANTED, the Management of Gas-** Works, 4 to 8 millions, by Inventor of the "Unique Copper Bit" (used at any angle, 7s. 6d.), son of T. Burtonshaw, Inventor and Patentee of the "Excelsior Tar-Burner" (16s. 6d.). Thorough knowledge of Manufacture and Distribution. Excellent testimonials.

Address W. H. BURTONSHAW, Gas-Works, WINCHCOMB.

---

**COMPETENT Draughtsman Wanted.** A liberal Salary will be paid to one accustomed to design Sulphate of Ammonia and Tar Works for Gas-Works.

Address, with full particulars (which will be treated confidentially), to "D. R. A., 265," Messrs. Deacon's Advertising Offices, LEADENHALL STREET, E.C.

---

**WANTED, by the Sligo Gas Company,** a competent GAS-FITTER.

State age, present and past employment, and wages required, to

C. B. TULLY, Manager and Secretary.

---

**WANTED, a Working Foreman to take** charge of Gas-Works (7 millions per annum). Good Carbonizer. One who can lay Gas Service Pipes and repair Stoking Tools preferred.

State, in own handwriting, age, salary required, and send copies of testimonials to No. 1670, care of Mr King, 11, Bolt Court, FLEET STREET, E.C.

---

**WANTED, a thoroughly qualified and** competent GAS ENGINEER for the Montreal Gas Company, Canada.

Applicants must enclose testimonials, and state age, experience, and salary.

Applications received up to the 31st of January inst., addressed to J. F. SCRIVER, Manager of the Montreal Gas Company, care of Mr. King, 11, Bolt Court, Fleet Street, LONDON, E.C.

*** Mr. Scriver is now in England, and may be seen (by appointment), in regard to this advertisement, by any of the applicants or others wishing to call upon him, at the Grand Hotel, Charing Cross, S.W.

---

**THE Oxford Gaslight and Coke Company** have FOR SALE a Double-Lift GASHOLDER in Cast-Iron Tank, with Guide-Framing complete. Capacity, 90,000 feet.

Offers (including removal) to Mr. ELDRIDGE, Engineer and Manager, who will give any further information.

---

**OUTSIDE LAMPS—Suitable for Public** Thoroughfare or for Business purposes. Four of Sugg's Patent 150-Candle Power LANTERNS on Iron Columns, in perfect condition, TO BE SOLD cheap.

Apply to Mr. MORTER, Gas-Fitter, 25, Park Street, Camden Town, LONDON.

---

HERTFORD.

TO TRUSTEES, INVESTORS, AND OTHERS.

IMPORTANT SALE OF SHARES IN THE HERTFORD GASLIGHT COMPANY.

**MESSRS. MEDCALF & SON have** been favoured with instructions from the Directors to Sell by Auction, at the Corn Exchange, Hertford, on Saturday, Feb. 2, 1889, at Four o'clock precisely, 200 NEW £10 SHARES in the HERTFORD GASLIGHT COMPANY. (Such New Shares to rank for Dividend with the Original Shares up to Seven and a Half per cent.)

The Auctioneers beg to draw special attention to this excellent opportunity for investment in the above Company's Shares, which always command a ready Sale when offered for competition.

Particulars and conditions may be had of Messrs. SWORDER AND LONGMORE, Solicitors, HERTFORD; of Mr. R. W. BRETT, Secretary to the Company; and of Messrs. MEDCALF AND SON, Auctioneers and Estate Agents, HERTFORD.

---

EAST GRINSTEAD GAS AND WATER COMPANY.

**THE Board of Directors wish to receive** TENDERS for the following PIPING:—

650 yards of 3-inch Water-Pipe.
50 „ 4 „ Gas-Pipe.
500 „ 3 „ „
400 „ 6 „ „

Weight and pressure of Pipes to be stated, and prices given separately.

Tenders are requested to be sent to the undersigned on or before the 30th day of January inst.

The Board does not bind itself to accept the lowest or any tender.

EVELYN ALSTON HEAD, Secretary.

6, High Street, East Grinstead,
Jan. 17, 1889.

---

PENRITH GAS-WORKS.

SURPLUS TAR.

**THE Gas Committee of the Penrith** Local Board of Health OFFER for Sale at their Works about 25,000 gallons of TAR.

Sealed offers, stating price per ton, must be delivered to the undersigned, not later than Monday, the 28th of January inst.

GEORGE WAINWRIGHT, Clerk.

Public Offices, Penrith, Jan. 19, 1889.

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CORPORATION OF BURNLEY.

**THE Gas Committee of the Burnley** Corporation are prepared to receive TENDERS for the purchase of the Surplus TAR and LIQUOR produced at their Works during the Twelve months commencing on the 26th of March, 1889.

The tenders for Tar and Liquor should be independent the one of the other.

Information as to probable quantity, &c., may be obtained from Mr. Saml. P. Leather, Gas-Works, Burnley.

Tenders, addressed to the Chairman of the Gas Committee, Town Hall, Burnley, to be delivered on or before Wednesday, the 30th of January, 1889.

WALTER SOUTHERN, Town Clerk.

Town Hall, Burnley, Jan. 11, 1889.

---

TO STATION METER AND GOVERNOR MAKERS.

**THE Directors of the Clayton, Allerton,** and Thornton Gas Company are prepared to receive TENDERS for a SQUARE STATION METER, in Cast-Iron Ornamental Case, capable of passing 40,000 cubic feet of Gas per hour. Also Two COMPENSATING GAS GOVERNORS, one 18-inch and one 15-inch, with all Bye-Pass Arrangements, Valves, &c.

Particulars to be obtained from the Company's Engineer.

All tenders to be sent in, addressed to the Chairman of the Company, and marked "Tender for Station Meter" or "Governors" as the case may be, on or before Monday, the 11th day of February, 1889.

By order,
JOHN NIVEN,
Engineer and Manager.

Gas Works, Clayton, near Bradford,
Jan. 18, 1889.

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ULVERSTON LOCAL BOARD.

SULPHURIC ACID.

**THE Gas and Water Committee invite** TENDERS for the supply of about 30 tons of B.O.V., made from Spent Oxide or Brimstone, suitable for the Manufacture of Sulphate of Ammonia.

Strength of Acid to be not less than 144° Twaddel.

Tenders, endorsed "Tender for B.O.V.," to state price per ton in carboys as required, delivered at Ulverston Station, including carriage of empty returns, to be sent in addressed to the Chairman of the Gas and Water Committee not later than the 31st inst.

JNO. SWAN,
Engineer and Manager.

Jan. 14, 1889.

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ULVERSTON LOCAL BOARD.

(GAS AND WATER DEPARTMENT.)

**THE Gas and Water Committee invite** TENDERS for the supply of RETORTS and other FIRE-CLAY GOODS required at these Works during the ensuing year.

Tenders, endorsed "Tender for Retorts, &c.," to be sent in addressed to the Chairman of the Gas and Water Committee not later than the 31st inst.

Particulars as to quantity, &c., may be obtained on application to the undersigned.

JNO. SWAN,
Engineer and Manager.

Jan. 14, 1889.

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STREET LANTERNS.

**THE Vestry of the Parish of St. James',** Westminster, invite PROPOSALS for Supplying and Fixing a number of STREET LANTERNS throughout the Parish, of the same design, and equal in finish to those now fixed in Regent Street.

Prices are to be quoted at per Lantern for 250 and 500 respectively, in Copper Frames, and in Tin Frames, 14 inches and 16 inches in diameter.

Tenders, on a form to be obtained of the undersigned, to be delivered, under cover, endorsed "Street Lanterns," at the Vestry Hall, Piccadilly, by or before Ten o'clock on the morning of Monday, the 4th day of February next.

The Vestry do not bind themselves to accept the lowest or any tender.

By order,
HARRY WILKINS, Vestry Clerk.

Vestry Hall, Piccadilly,
Jan. 17, 1889.

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BRISTOL UNITED GASLIGHT COMPANY.

AMMONIACAL LIQUOR.

**THE Directors of this Company invite** TENDERS for the purchase of the AMMONIACAL LIQUOR to be produced at all or either of their three Stations during a period of One, Three, Five, or Seven years, commencing on the 1st day of July, 1889.

The annual quantities and strengths of the Liquor produced at each of the Stations at present are approximately as follows:—

| | | Gallons. | | |
|---|---|---|---|---|
| Canons' Marsh Station, | | 1,000,000 | of 14 ounce | Strength. |
| Avon Street | „ | 1,300,000 | „ 15 „ | „ |
| Stapleton | „ | 700,000 | „ 17 „ | „ |

Conditions of Contract, and forms of tender, may be obtained on application to the undersigned, to whom also tenders, sealed, and endorsed "Tender for Ammoniacal Liquor," must be delivered not later than Ten a.m. on Monday, the 28th day of January, 1889.

The Directors do not bind themselves to accept the highest or any tender.

JAS. V. GREEN, Secretary.

Chief Offices: Canons' Marsh,
Bristol, November, 1888.

---

FITTINGS FOR RETORT MOUTHPIECES.

**THE Directors of the Sheffield United** Gaslight Company invite TENDERS for FITTINGS for 112 RETORT MOUTHPIECES.

Drawings may be seen, and forms of tender with bill of quantities obtained, on application to the Company's Engineer, Mr. Fletcher W. Stevenson.

Tenders, marked as above, must be forwarded to the undersigned not later than Monday, Feb. 4, 1889.

By order,
HANBURY THOMAS,
General Manager.

Commercial Street, Sheffield.
Jan. 21, 1889.

---

MERTHYR TYDFIL GAS COMPANY.

OXIDE OF IRON.

**THE Committee of Directors are pre-** pared to consider TENDERS for the supply of 50 tons of OXIDE OF IRON for Purification purposes, delivered on the Railroad Siding of the Company, at the Works.

Particulars may be obtained on application to the Manager.

Tenders, endorsed "Oxide," addressed to the undersigned, will be received up to Thursday, the 31st inst.

The lowest or any tender not necessarily accepted.

By order,
JOHN L. COCKER,
Manager and Secretary.

Gas Offices and Works,
Merthyr Tydfil, Glamorganshire,
Jan. 10, 1889.

---

MERTHYR TYDFIL GAS COMPANY.

SPENT OXIDE OF IRON.

**THE Committee of Directors will be glad** to receive OFFERS for the purchase of about 80 tons of SPENT OXIDE.

Samples and particulars may be had on application to the Manager.

Offers, endorsed "Spent Oxide," addressed to the undersigned, will be received up to Thursday, the 31st inst.

The highest or any offer not necessarily accepted.

By order,
JOHN L. COCKER,
Manager and Secretary.

Gas Offices and Works,
Merthyr Tydfil, Glamorganshire,
Jan. 10, 1889.

---

TO INVENTORS AND PATENTEES.

**MR. W. H. BENNETT having had** considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Invention may be secured for Twelve months; or LETTERS PATENT, which are granted for Fourteen Years.

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**CHARLES HUNT, M. Inst. C. E.,**

Engineer of the Works.

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**CANNEL COAL MERCHANT,**

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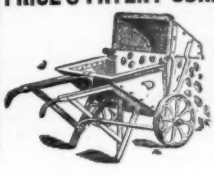

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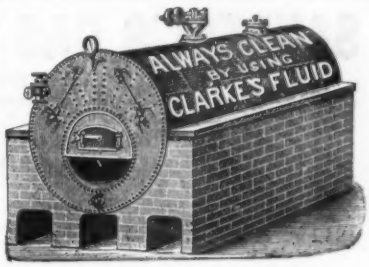

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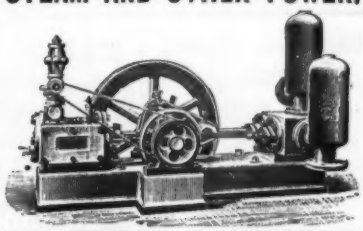
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ADVANTAGES ATTENDING ITS USE ARE:—

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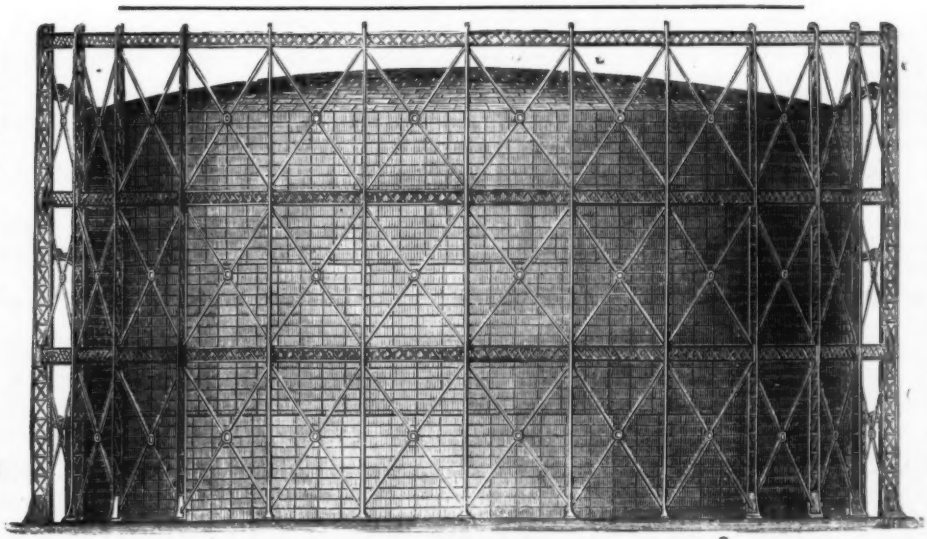

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Is a ready means for the Small Consumer to pay for his Gas in advance, and in small quantities, either daily, weekly, monthly, or at any given period in which a certain quantity will be required.

The result is a great benefit to the consumer, as he has no calls, dunning him for the "Money for the Gas," from collectors; if he has used his ONE PENNY'S WORTH, he can always drop in another PENNY without asking anyone. Has no fear of having his "Gas Cut Off," pays as much as he likes, consumes what he pleases, and is in every sense his own master, so far as Gas supply is concerned.

To Gas Companies and Gas Committees

## Brownhill's "Prepayment Gas-Meter"

Offers enormous facilities for the extension of Gas supply, especially to Small Consumers. Statistics show that there are 50 per cent. non-consumers situated along the lines of Gas-Mains in districts where there is a good supply at the door. No expensive system of collection has to be adopted; and the cash is paid always before the Gas is consumed. Gas suppliers must look to the consumers of small quantities of Gas to increase the consumption of Gas. If

## Brownhill's "Prepayment Gas-Meter"

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### DESCRIPTION OF METER.

This Patent is a small attachment which can be applied to all Meters, new or old, and which will deliver gas in quantities as paid for by pence deposited in a box.

The attachment is made so that only one penny at a time can be put into the box. Although 143 pence can be put in consecutively, each penny will pay for sufficient gas for one burner, to last between six and eight hours. When a gas consumer pays a penny or any number of pence into the meter, the action of the meter will be at once operated upon to a proportionate extent. A dial will also at all times indicate the amount paid for, and not used. The light will diminish a quarter of an hour before the gas paid for is actually used up; thus giving notice that a further payment is required.

The object of the "Prepayment Gas-Meter" is to place the consumption of gas as easily within reach of the mass of the population as petroleum, candles, &c., so that it may be purchased even a pennyworth at a time, and without any initial outlay or trouble, such as deposit, reference, or guarantee, now required by the Gas Companies. The increased light and many conveniences of gas would thus be obtained economically; and the great danger from petroleum and benzoline, and the disagreeable smell from cheap lamps and oil, obviated.

An important consideration, which cannot be overlooked, is the duty of Gas Companies and Corporations, who have a first-class monopoly, to supply the working classes with gas, without the burden and restrictions which now exist.

It is anticipated that there will be a great demand for these Meters in houses of all classes, especially in those with rents ranging from £13 to £50 per annum, as it will be a great advantage to these occupiers to pay for their gas only as it is required, as for other household goods. **Occupiers will thus be able to control their weekly expenditure of Gas, and to check leakages and waste.**

The Meter will be in demand for—

(1) Sub-tenancies in large manufacturing premises where each sub-tenant has to pay for gas. This is a large class, both in London and the provinces.
(2) Stable and yard purposes, connected with hotels and other places of business.
(3) Householders generally, as, by using this attachment, caretakers or servants will only require pence to obtain their gas, and cannot use it beyond the amount paid for; and thus when houses are left in charge of caretakers or servants the consumption of gas would be controlled.
(4) Rooms or premises let for entertainments by day or week.

Messrs. Sommerville & Co., of 17, Temple Street, Birmingham, are now prepared to enter into Contracts with Gas Companies, Corporations, Local Boards, and Others for the supply of

## Brownhill's "Prepayment Gas-Meter,"

and with Gas-Meter Manufacturers, for the right to adopt the prepayment principle. The system is an unqualified success. The meters have been examined by hundreds of Engineers and others interested in Gas supply, and have been favourably reviewed in the

"Journal of Gas Lighting," "Gas World," "Gas and Water Review," &c., &c.

PATENTEE:
R. W. BROWNHILL, Aston, near BIRMINGHAM.
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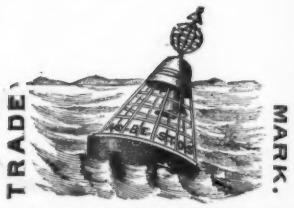
## ADVANTAGES OF ASBESTOLINE.

**ASBESTOLINE** is the most efficient Lubricant for all bearings.
**ASBESTOLINE** is the cheapest Lubricant.
**ASBESTOLINE** saves from 50 to 90 per cent. of the Cost of Oil.
**ASBESTOLINE** is the Cheapest Lubricant.
**ASBESTOLINE** is favoured by Insurance Companies.
**ASBESTOLINE** is the most Inodorous Lubricant.
**ASBESTOLINE** is the safest Lubricant from Ignition.
**ASBESTOLINE** has beaten all other Lubricants in trials.
**ASBESTOLINE** is applicable in and out doors in every Climate.
**ASBESTOLINE** requires no special application.




## CONSISTENCY OF ASBESTOLINE.

**ASBESTOLINE,** to meet all circumstances, is made in four degrees of consistency—A, B, C, and CC.

**ASBESTOLINE, A,** is specially adapted to ordinary Land Engines and Machinery, in and out door, in this country.

**ASBESTOLINE, B,** a little more solid, is for use on Steamships in temperate climates, also on land when it is desirable to have Lubricant stiffer than A.

**ASBESTOLINE, C,** is for use in tropical climates, both ashore and afloat. It is also invaluable in works in this country when the temperature is high.

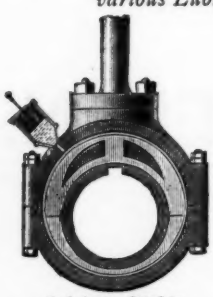
**ASBESTOLINE, CC,** is designed for use on Calenders, Paper-Machines, &c., where the bearings are heated by steam passing through, and sometimes is advantageously used instead of C.

The reputation of Asbestoline as a Lubricant of the highest efficiency in every kind of Machinery is established; and it has never been equalled by any other Lubricant in the numerous cases of special difficulty in which the best oils are ineffectual. It is used with marked success in Steel and Iron Works, Collieries, Cotton and Wool Mills, and other Textile Manufactories. In Corn-Mills it has proved invaluable on the roller and other modern machines. In Saw-Mills, on machines going up to 5000 revolutions per minute, its work has never been approached by any other Lubricant. On Electric Lighting Machinery, and in Steamships of all sizes throughout the world, the success of Asbestoline is unequalled. Many engines and machines of all descriptions give trouble, and show bad results both in working and wear, when the system of lubrication has not received due consideration. Engineering firms of the highest standing have given to it their powerful testimony and support.

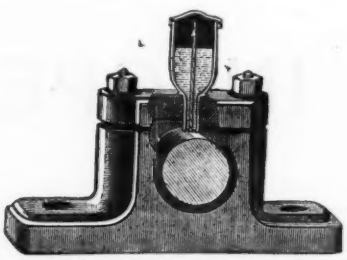
## Supplied in Kegs, 28, 56, or 112 lb. Price, 2/3 per lb. Kegs Free. Special Terms for Large Quantities.

**IMPORTANT TO EXPORT MERCHANTS.**—*One pound of "Asbestoline" equals 2 gallons of Oil weighing 18lbs.; consequently the saving in freight is very considerable. Liberal Terms are conceded to Export Merchants.*

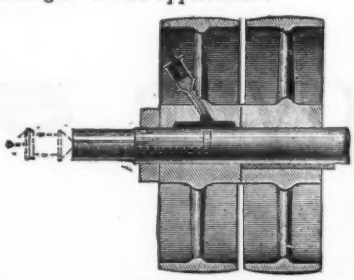
*Below will be found illustrations of the mode of fixing Lubricators for Asbestoline to bearings. Full particulars of the various Lubricators supplied for Asbestoline, and the manner of fitting, in catalogue free on application.*



Lubricator fitted to Eccentric of Vertical Engine



Showing Section of Lubricator fitted to ordinary Bearings.



Lubricator in different position for Loose Pulleys.

THE ATTENTION OF

## ENGINEERS, AND ALL USERS OF STEAM POWER AND MACHINERY,

IS SPECIALLY INVITED TO THE FOLLOWING REPORT.

Owing to the number of Greases now offered, samples of BELL'S ASBESTOLINE were submitted to Otto Hehner, Esq., for analysis, and the subjoined Report fully proves BELL'S ASBESTOLINE to be the safest as well as the best Lubricant for all purposes:—

*The Laboratory*, 11, *Billiter Square, E.C., London, May* 3, 1888.

I have subjected a sample of Bell's Asbestoline taken from the stores of Messrs. J. Bell and Son, in Southwark Street, to a number of tests, in order to ascertain whether its use in Mills or Factories might contribute to the danger from Fire.

I found that Asbestoline **ignites only with the greatest difficulty** when brought into contact with flame; that wood and other combustible material soaked in Asbestoline burns, if anything, with greater difficulty than by itself; that its **flashing point** is so high that it **lies beyond the range of Mercurial Thermometers**; and that consequently no friction obtainable in the ordinary run of machinery is capable of developing inflammable vapours from it.

Bell's Asbestoline is **as absolutely safe a Lubricant as can be desired or obtainable.** In the case of fire breaking out from any cause, it does not assist the conflagration; and it is **quite incapable of leading to spontaneous combustion,** either by itself or in contact with inflammable material.

From the physical nature of Asbestoline its use is of necessity perfectly clean and free from waste.

(Signed) OTTO HEHNER, Public Analyst.

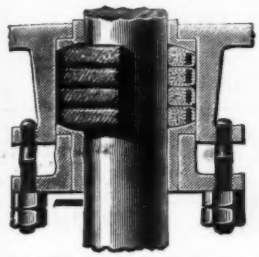
*Illustrated Priced Catalogue, with numerous Testimonials by Leading Firms, free on application.*

# BELL'S ASBESTOS COMPANY, LIMITED,

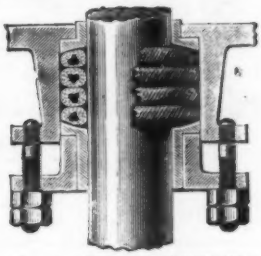
**DEPOTS—MANCHESTER:** Victoria Buildings, Deansgate. **LIVERPOOL:** 2, Strand Street, James Street.

# BELL'S ASBESTOS DAGGER PACKING

PATENT No. 15,496.



ROUND. SQUARE.



Every 10 feet has Label as above, and bears our Trade Mark.

Under this registered title are included the inventions of Mr. Field; and experience has proved them to be the MOST EFFICIENT, DURABLE, and ECONOMICAL PACKINGS ever made. They constitute such a combination of Asbestos and India-rubber as secures the maximum of elasticity and heat resistance; and they are, therefore, UNEQUALLED FOR EVERY KIND OF ENGINE. These Packings are being universally used by most of the leading Steamship Companies throughout the world for ordinary Compound, Triple, and Quadruple Expansion Engines of the latest type. The Packings are composed of rolled Asbestos Cloth, but the India-rubber is placed in two forms to suit various cases.

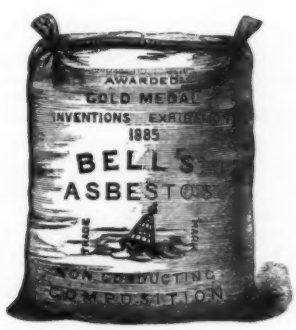
IN ORDERING STATE WHETHER SQUARE OR ROUND IS REQUIRED.

Price of either Section, 5s. 6d. per lb. Steam Vulcanized, 6s. 6d. per lb.

# BELL'S ASBESTOS NON-CONDUCTING COMPOSITION,

FOR COVERING BOILERS AND STEAM-PIPES,

Will reduce loss by radiation to a minimum and save 40 per cent. of fuel.

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Second Quality, 15s. per Cwt., is superior to the best sold by other Firms.

It is essential in covering that it shall not only be a non-conductor, but a substance free from whatever can injure metal, and of a nature which will enable it to adhere well for years. To do this it must be sufficiently elastic to prevent cracking and leaving, by expansion and contraction, the heated surfaces to which it is applied. This Composition is daily applied to Tanks with Round or Flat Bottoms, and its adhesive properties enable it to keep to the surfaces without bands or any device necessary for holding on other compositions. Our covering never fails to Save its Cost in a few months, lasts for years, after which it can be taken off and applied again with a little fresh. In all respects it is so superior as to be infinitely cheaper than Compositions sold at one-fourth the price. We would point out that this, being supplied dry in bag, will cover six times more surface than other materials which are sent out wet in cask. This shows the apparent low prices of other Compositions to be a sham.

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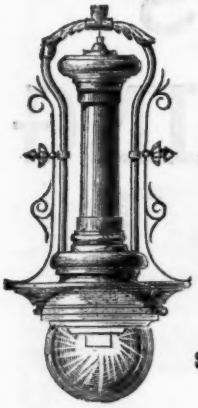

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MOST INTENSE WHITE BRILLIANT GAS LIGHT.
MOST ECONOMICAL, SIMPLE, AND DURABLE.
DOES NOT GET OUT OF ORDER.
RIVALS THE ELECTRIC LIGHT.
NO ALTERATION REQUIRED TO EXISTING FITTINGS.
BURNER, BEING A CIRCULAR SLIT, DOES NOT CHOKE UP.

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Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

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2. They can be made in one piece up to 10 feet long.
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THE ADVANTAGES OF A WHITE, BRILLIANT, STEADY LIGHT ARE UNDENIABLE.

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AN ACKNOWLEDGED SUCCESS. HAS STOOD THE TEST OF TEN YEARS.
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Single Lights from 6/- upwards. Cluster Lights from 40/- to 145/-.

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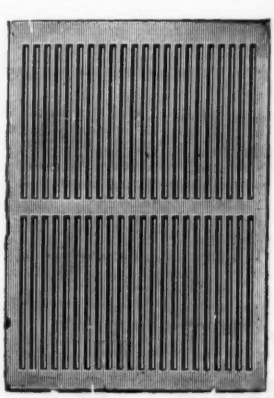

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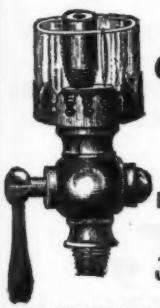

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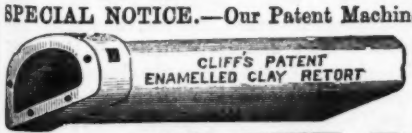


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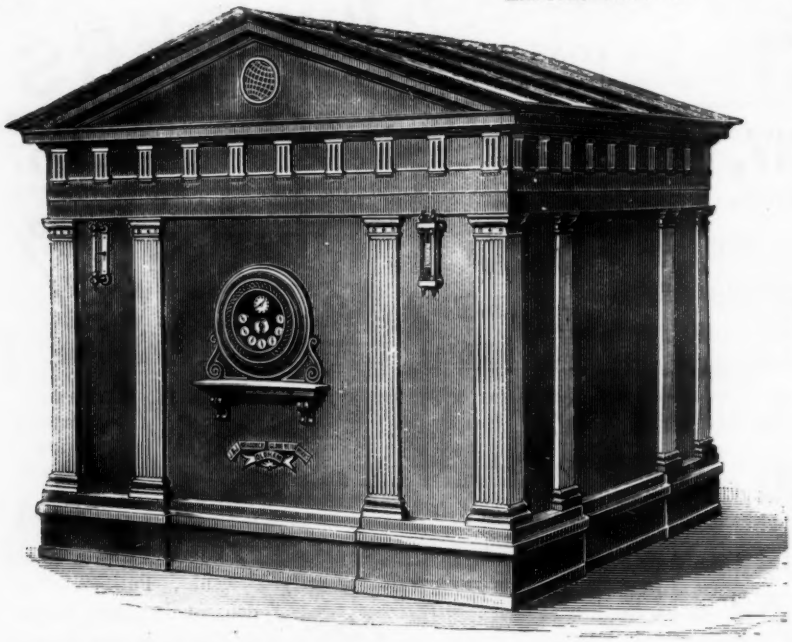

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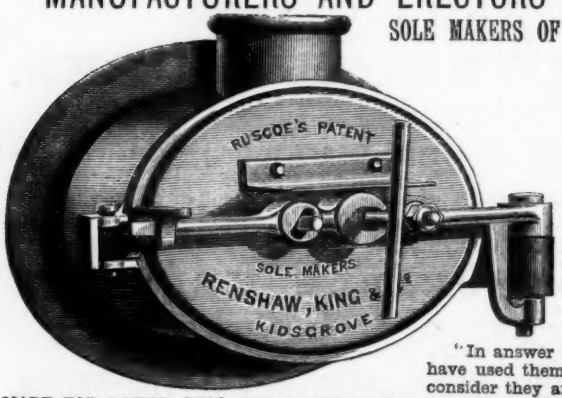


This Lid and Fastener is specially designed for taking up the wear and tear caused by refacing the Mouthpiece and Lid, hitherto in a large measure overlooked; and, in addition, from the special way in which the Lid is attached to the Cross-bar, the Lid has free action, and thus secures a more uniform scrape over the whole surface when being forced home by the Screw, the closing pressure being much more equally distributed than in any other form of fastening. The Lid itself is well ribbed, internally and externally; thus securing the Tightest, Strongest, and Simplest Lid in the Market, and the most easily adapted to existing Mouthpieces. The Cross-bar being of steel, it is not liable to be strained; and there is no Eccentric to wear and become inoperative.

"In answer to your inquiry as to Ruscoe's Patent Retort-Lids, we beg to say that we have used them in several works, and are thoroughly satisfied with their action. We consider they are the best in the market.—G. W. STEVENSON & SON."

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